

CHILDREN'S COMMUNICATION IN A
PROBLEM-SOLVING CONTEXT:
GENDER DIFFERENCES AND THEIR EFFECTS UPON
ADULT ASSESSMENT OF TASK-ABILITY

Robert Bruce Thompson

Doctor of Philosophy



1996



DECLARATION OF AUTHORSHIP

**I declare that this thesis has been composed by myself and that
the work in it is my own.**

Robert Bruce Thompson

ACKNOWLEDGEMENTS

Dr. Morag Donaldson and Dr. Hamish Macleod, my supervisors for this Ph.D. research, provided a unique combination of support and direction for which I am very grateful. But their support went far beyond the requirements to supervise a Ph.D. thesis. Their willingness to provide opportunities for personal and professional growth is something I will always remember.

Special thanks for their help in my experimental work go to Muriel Slade, head of the Psychology Department Nursery and to Ilene Sharp, head teacher at the Liberton Nursery School; and warmest thanks go to the parents and the children of both nurseries, who so cheerfully participated in my research. At Moray House College, Helen Fraser provided essential support in organising and conducting research for the study of adult interpretation of children's communication.

Kirsty Moore, in the Department of Psychology generously gave her time and expertise as the second experimenter in Study 2 and in conducting reliability tests.

Wendy Dignon, at the Edinburgh Education Advisory Service provided valuable assistance in schools liaison. Acknowledgement goes to the Lothian Regional Council's Research Evaluation Committee, for allowing the research to be conducted. This research was supported in part by the Vans Dunlop Scholarship Award.

Lastly, this research could not possibly have been completed without the encouragement and help of my wife Betsy. She not only supported and encouraged me for almost four years, but as a professional educator provided essential theoretical and practical discussion, critique of experimental design and written work. This dissertation is dedicated to her with the greatest affection and admiration.

ABSTRACT

The main aim of this research has been to address the issue of *meaning* in children's task-related utterances, by examining speech acts made whilst solving a challenging problem and their relationship with task-ability. Of particular interest is communication which in educational settings may be interpreted as being help-seeking, reflecting dependence or low self-confidence. A central concern in this work is possible gender differences in the way children express themselves and interact with adults in problem-solving settings, and particularly how such differences may be interpreted by caregivers and teachers.

Chapter 1 introduces the issues addressed in the thesis, including the historical context of gender research in the areas of cognitive ability, interactional style and achievement motivation and expectation. The literature review (Chapter 2) provides a central theoretical framework (deriving from developmental psychology, speech act theory and pragmatics) within which the experimental design, data analysis and interpretation of findings are discussed. An important issue is the presumed relationship between children's achievement motivation (including task-mastery, competitiveness etc.) and affiliative motivation (including cooperative interactional styles, deferential language use, etc.) This research has specifically examined the validity of these constructs as gender-related and, moreover, their presumed existence as competing motivations.

The experimental work was conducted with nursery children, an age group which has received little attention with regard to *task-related* communication. This was undertaken to determine the degree to which children's spontaneous communication, particularly help-seeking behaviour, reflects actual ability. Of specific interest were possible gender differences. In Studies 1 and 2 children were videotaped solving a challenging jigsaw puzzle in the presence of the experimenter. A coding system (Chapter 5) with definitions based upon the contextualised meaning of children's utterances was developed by the researcher, which provided a means of analysing the frequency and exact sequence of communicative behaviours, as well as their grammatical structure and orientation (to whom or what they refer).

Analysis of data described in Chapter 6 revealed striking differences in both the orientation and the frequency of help-eliciting utterances made by boys and girls. Also of interest was the finding that girls' help-eliciting behaviour, whilst greater, did not reflect task-ability as did the boys', but among some girls increased with

faster puzzle solving time. The girls were also observed to use more collaborative expressions (those that engage others using plural pronouns), make longer eye-contact and more help-eliciting utterances that were self-referential; whilst the boys' on-task utterances of all types were dominated by "instrumental" language (object-oriented). In the light of this evidence for greater "pro-social" communication among the girls, and equal solving time between boys and girls, it is suggested that affiliative motivation may indeed be greater among girls, but exists in parallel with achievement motivation, and is not a competing priority. Moreover, it is suggested that nursery aged children are capable of appropriating "help-eliciting" as a means of indirect social engagement, because of their sensitivity to the social constraints of a formal problem-solving context.

Study 3 (Chapter 8) was conducted in order to assess the influence that help-eliciting behaviour, as a possible dimension of "communication style," may have upon the evaluative interpretation of educational practitioners. It was found that children, regardless of gender, with a high level of help-seeking, yet equal task performance, were pervasively underestimated by teacher trainees and professionals alike, with regard to the children's relative task-ability, confidence and independence.

Chapter 9 concludes by discussing the overall theoretical implications of Studies 1 and 2 within the framework of development and linguistics and by highlighting practical implications raised by Study 3, particularly the potential for teacher bias and self-fulfilling prophecies in relation to academic achievement.

CONTENTS

CHAPTER 1 INTRODUCTION

1.1	The debate about causal factors in gender differences	1
1.2	Developmental pragmatics	4
1.3	Problem-solving and help-seeking	6
1.4	Adult-child interaction, social motivation and intersubjectivity	7
1.5	Overview of thesis	9

CHAPTER 2 SEX AND GENDER, LANGUAGE, AND SOCIAL DEVELOPMENT

2.1	Chapter overview	12
2.2	Gender roles and society a socio-political digression	14
2.3	Gender and cognition visual-spatial vs. linguistic debates	16
2.4	Confidence, achievement expectation and language	20
2.4.1	Confidence and locus of control	22
2.4.2	Adult attributions of achievement expectancy and ability	24
2.5	Socialisation of achievement motivation and expectation	25
2.5.1	Putatively neutral pronouns and gender role development	25
2.5.2	Reinforcement of dependency styles	26
2.5.3	Perceived appropriateness and achievement expectation	29
2.6	Gender, language development and interactional style	31
2.6.1	Early gender differences in language acquisition and use	32
2.6.2	Development of communicative style	33
2.6.3	Self-presentational style	34
2.7	Problems with traditional models of "masculine" and "feminine" speech development	37
2.8	"Style" and "ability" in language development	41
2.9	Developmental pragmatics, speech act theory, and the meaning of children's utterances	43
2.10	Children's developing pragmatic ability	45
2.10.1	Pragmatic utterances and unifying theories of innate social behaviour and learning	46
2.10.2	Theories of children's private speech and further issues with pragmatic development	49
2.11	Children's questions and requests	51
2.12	Alternative approaches to language development	58
2.13	The primacy of conversational motivation	59
2.14	Establishing "context" in adult-child interaction	60
2.15	Adult bias in the interpretation of language and ability	62
2.15.1	Problems of context and adult interpretation of children's utterances	63
2.15.2	Philosophical and practical treatment of "context"	66
2.16	Research questions	67

CHAPTER 3 PILOT WORK

3.1	Aims and scope of Pilot Study	70
3.2	Development of the experimental setting	71
3.2.1	Selection of subject group	71
3.2.2	The Experimental setting	71
3.2.3	Selection of appropriate problem-solving tasks	73
3.3	Data collection	74
3.3.1	Video-recording and editing equipment and procedure	74
3.3.2	Nursery and Experimental Setting Procedure	76
3.3.3	Collation and Analysis of Pilot Study Data	78
3.4	Results of Pilot Study	80
3.5	Comments and Conclusion on Pilot Study	82

CHAPTER 4 METHODS FOR STUDIES 1 AND 2

4.1	Subject recruitment, research approval, school and parent contact	87
4.2	Methods for Study 1	88
4.2.1	Problem-Solving Task	88
4.2.2	Audio and video recording and editing equipment and procedure	89
4.2.3	Experimental Procedure	90
4.2.4	Experimenter responses to children's verbal and non-verbal behaviours	91
4.3	Study 2 gender-of-experimenter as a mediating variable in children's task-related communication	93
4.3.1	Aims of study	94
4.3.2	Procedures for school visits and experimental sessions	95
4.3.3	Subjects and problem-solving tasks for Study 2	96
4.3.4	Analysis of videotape data for Study 2	97

CHAPTER 5 CODING SYSTEM FOR STUDIES 1 AND 2

5.1	Aims and scope of Study 1 coding system	101
5.2	Coding system used for analysing non-verbal behaviours	103
5.2.1	"Searches"	103
5.2.2	Correct and incorrect placement of puzzle-pieces	103
5.2.3	Eye-contacts	104
5.3	Coding system used for analysing verbal behaviours	104
5.3.1	"Help-eliciting" utterances	105
5.3.2	Neutral/self-reliant utterances	108
5.3.3	Form of speech	109
5.3.4	Orientation of speech acts	110
5.4	Hedges and tag questions	111
5.5	Collaborative expressions	112
5.6	Procedure for recording of videotape data	113
5.7	Inter-observer reliability	115

5.8	Coding system for analysing experimenter behaviours (Study 2)	117
5.8.1	"Positives," "negatives" and "neutrals"	120
5.8.2	Responses to children's statements	122
5.8.3	Refocussing	122
5.8.4	Inter-observer-reliability checks for analyses of experimenters' behaviour	124
CHAPTER 6 RESULTS OF STUDIES 1 AND 2		
6.1	Procedure for statistical analysis of frequency data and sequential data	126
6.1.1	Frequency and elapsed-time data (Study 1)	126
6.1.2	Sequential data	127
6.2	Study 1 results	128
6.2.1	Problem-solving performance	129
6.2.2	Self-presentation "help-eliciting" and neutral/self-reliant speech acts	131
6.2.3	Composite scores for HEUs and N/SRUs (gender differences)	131
6.2.4	Sub-category findings for HEUs and N/SRUs form of speech and orientation	132
6.2.5	Hedges and tag questions	134
6.2.6	Use of collaborative expressions	134
6.3	Orientation of speech acts (Study 1)	135
6.4	Eye-contact frequency and duration	138
6.5	Correlational analyses examining children's verbal behaviour	139
6.5.1	Composite HEU and N/SRU scores and solving time	140
6.5.2	Orientation sub-categories of self-presentation and performance	147
6.6	Sequential analysis using verbal and non-verbal behaviours	148
6.6.1	Quartile time analysis of HEUs	149
6.6.2	Search onset to HEU elapsed time	149
6.7	Results of study 2 gender of experimenter as a mediating variable in children's communicative behaviours.	151
6.7.1	Statistical analysis for gender of experimenter study	151
6.7.2	Pair-wise comparisons between HEU and N/SRU frequency data collected by male and female experimenter	151
6.7.3	Use of collaborative expressions (Study 2)	158
6.7.4	Correlation analyses for male and female experimenter	158
6.8	Study 2 as a partial replication study	161
6.9	Comparison of Study 1 data and Pilot Study data	163
6.10	Results of analysis of experimenter behaviours, Study 2	166
6.10.1	Procedure for analysis of experimenter behaviour data	167
6.10.2	Frequency data results for experimenter behaviours	168
6.10.3	Sequential analysis results for experimenter behaviours.	174
6.10.4	Correlational analyses between child and experimenter behaviour	177

CHAPTER 7 DISCUSSION AND CONCLUSIONS FOR STUDIES 1 AND 2

7.1	Review of research questions	179
7.2	Performance and main gender effects	181
7.3	Performance and help-eliciting utterances evidence for non-literal, socially facilitating language among preschool girls.	183
7.4	Pro-social language	186
7.5	Discussion of Study 2 effects of experimenter gender and experimenter behaviour analysis	187
7.6	Social motivation versus achievement motivation evidence for compatibility	189
7.7	Concluding remarks for Studies 1 and 2 and suggestions for further research	191

CHAPTER 8 COMMUNICATION STYLE AS A FACTOR IN ADULT ASSESSMENT OF CHILDREN'S PROBLEM-SOLVING ABILITY

8.1	Aims of Study 3	193
8.2	Theoretical overview	194
8.3	Subject selection	196
8.4	Stimulus material	197
8.5	Methods for Study 3 Subject recruitment, ethical considerations, experimental procedure and data collection.	201
8.5.1	Subject recruitment	201
8.5.2	Questionnaires for examining adults' evaluation of children's problem-solving	202
8.5.3	Administrative procedure	204
8.5.4	Procedure for statistical analysis	206
8.6	Results of study 3, adult evaluation of children's problem-solving	208
8.6.1	Results of analysis of individual questionnaire responses	210
8.6.2	Results of follow-up comparative questionnaire	213
8.6.3	Results of free response question	217
8.7	Comparison between "experienced" group and "inexperienced" group	219
8.8	Discussion and conclusions for adult evaluation study	226
8.8.1	Interpretation of main effects	226
8.8.2	Differences between experimental groups	230

CHAPTER 9 DISCUSSION OF FINDINGS OVERALL AND CONCLUDING REMARKS

9.1	Recapitulation of research questions and hypotheses	232
9.2	Children's problem-solving communication discussion of overall results	233
9.3	Theoretical implications of findings	235
9.3.1	Revisiting "social versus achievement" motivation	235
9.3.2	Differentiating "meaning" and "intended meaning"	236
9.3.3	Children's linguistic abilities	237
9.3.4	Interactional style "speech genres," "voice" and "codes"	239
9.4	Practical implications effects of children's problem-solving communication on adult evaluations of task-ability	241
9.5	Experimenter-gender effects	244

9.6	Directions for further research	245
9.6.1	Children's problem-solving communication in other settings	245
9.6.2	Effects of adult gender on children's spontaneous communication	246
9.6.3	The role of reduced interaction and feedback on adult interpretation of ability	246
9.7	Concluding remarks	247
APPENDICES		
	Letter to Lothian Regional Council's Research Evaluation Committee	251
	Letter to parents of the Liberton Nursery School	251
	Permission form for children to participate in Study 1	255
	Research proposal submitted to Moray House College	256
	Letter to 1st year Moray House College students inviting participation in Study 3	257
	Individual child questionnaires (Study 3)	258
	Follow-up direct comparison questionnaires (Study 3)	259
REFERENCES		260

TABLES

3.1	Summary of results for Pilot Study	80
6.01	On-task puzzle solving time (in minutes and age group analysis of variance)	130
6.02	Children's composite HEU and N/SRU scores comparing males and females	131
6.03	Sub-category HEU and N/SRU comparisons	133
6.04	Proportional frequencies of utterances by orientation and gender	136
6.05	Children's frequency and duration of eye-contact	138
6.06	Children's total HEU and N/SRU scores: Correlation with puzzle solving time	141
6.07	Correlation analyses for sub-categories of HEUs and N/SRUs with puzzle solving time	148
6.08	Comparisons of children's HEUs for each quarter of solving time	150
6.09	Comparisons of children's N/SRUs for each quarter of solving time	150
6.10	On-task solving time, mixed two-way analysis of variance (Study 2)	152
6.11	Children's composite HEU and N/SRU scores with male and female experimenter	153
6.12	Children's sub-category HEU and N/SRU scores with male and female experimenter	154
6.13	Orientation of children's HEUs and N/SRUs with male and female experimenter	156
6.14	Children's total HEU and N/SRU scores: Correlations with solving time (male and female experimenter)	159
6.15	Correlation analyses for HEU and N/SRU sub-categories and solving time (male and female experimenter)	161
6.16	Frequency data for experimenter behaviours (male and female experimenter across gender of children)	170
6.17	Sequential data for experimenter behaviour (male and female) across gender of children	176
8.01	Evaluation of task-ability overall	209
8.02	Evaluation of task-ability (post-hoc analyses)	210
8.03	Ranking of children's task ability overall	214
8.04	Ranking of children's task-ability (post-hoc analyses)	215
8.05	Adult evaluation of task-ability comparing experience level	220
8.06	Adult ranking of task-ability comparing experience levels	223

CHAPTER 1 INTRODUCTION

1.1 The debate about causal factors in gender differences

There is now abundant research which has scrutinised both the subtle differences in male and female cognitive/intellectual aptitudes, and the less subtle social behaviour differences. There will continue to be debate as to how and why these differences emerge in early childhood, particularly the degree to which they can be attributed to genetic factors or to learning. The "nature or nurture" question, may in fact prove to be the wrong question to be asking when pursuing answers to the very long standing questions about human gender roles, not least because most researchers now favour an interactionist perspective. The question "nature or nurture?" with regard to gender roles, may also reflect very old category mistakes since being human is to be an innately social learner. That is to say, while we learn social norms which appear to be culturally contingent, there is no obvious way to know *what* we may be *predisposed* to learn. Thus while the role of social learning in gender-related behaviour has been studied now for decades and is widely accepted; we also cannot discount the role of genetic predispositions, and perhaps even innate inclinations to be receptive to certain gender-specific learning cues (which themselves may be social artefacts). This point, made by many psychologists (see reviews by Halpern (1992) and Singleton (1986) takes its cue from ethology which, while accounting for learned (i.e. socialised) behaviours, does not lose sight of the possibility that what *can* be learned by an organism may be "hard wired," and that determining the primacy of either can be difficult or impossible. This viewpoint requires a fundamental interaction, and acknowledgement that the debate over which factor is dominant has created circular and possibly unresolvable sets of arguments. Although the role of "nature" and "nurture" has in the past polarised researchers, they are currently widely believed to be complementary and mutually contingent upon one another.

The gender research relevant to this project, reviewed in Chapter 2, primarily includes findings regarding how males and females may differ in linguistic ability and style. These apparent differences have traditionally been used to make attributions regarding underlying differences in motivation for achievement (task mastery) and affiliation (sociability), two inclinations which are usually described as competing and even irreconcilable forces. Historically, these motivations have been conveniently split to represent the two ends of the gender spectrum--masculinity and femininity. This traditional gender/motivation dichotomy will be

critically evaluated through a discussion of available research, and through the experimental work conducted in this study. The terms "gender" and "sex" have traditionally referred to aspects of identity that are socially constructed and biologically determined respectively. However, the emergence of social learning theory brought with it a tendency to use "gender" in a far broader way, often referring to behaviour and mental function traditionally thought to be biologically determined. For most discussion about differences and similarities between males and females "sex" will only be used with regard to undisputed biological differences.

In 1972 Horner published her paper on female fear of success, which for many came as a welcome relief from the painful dilemma caused by the unavoidable fact that females test as highly on intelligence measures and surpass males in school achievement across most subjects (Maccoby and Jacklin, 1974), yet consistently fail to reach parity in later educational (university) and professional achievement settings. Her thesis was that females, because of biological imperatives relating to affiliative behaviour, nurturance and cooperation, were averse to personal ambition and competition, typically "male" attributes, which together were anathema to their female sensibilities and perceptions about appropriate self-image. During the same era, contemporaries such as Hutt (1972), Kimura (1969), Harter (1975), Benbow (1982) and others, were publishing research evidence for sex differences in cognitive processing which encompassed many of the apparently critical aspects of mental function, such as spatial and verbal ability, logical reasoning, maths ability, etc. which cumulatively seemed to offer conclusive, even organic explanations for childhood play preferences and adult gender roles. Together with a "fear of success" theory, these findings provided a compelling set of assumptions that could account for any and all differences in social and professional status.

Thus, whether the researchers themselves intended it or not, such work was often used in politically divisive ways. There is, however, a counter example for nearly every study purporting to show a significant sex difference. Horner's quasi-cognitive theory was largely debunked by later research (e.g. Feather, 1975; Zuckerman and Wheeler, 1975) which indicated that "fear of success" was more accurately described as apprehension towards "sex-inappropriate" work and roles, which has more to do with social pressure than intrinsic motivations. Hyde (1981) re-examined the differences in verbal vs. maths ability, concluding that "sex differences generally account for no more than 1% to 5% of the population variance". Hyde and other researchers argue that the differences are too small

to account for the discrepancy in social life. Research reviews by Lenney (1977) and (Nicholson, 1984) have asked why the level of women in high-status positions is still so low (approx. 5% lawyers, 6% judges, 9% physicians, etc.); and why representation in female-traditional roles is so high (97% among registered nurses and similar figures for the service industries.)

A great deal of debate has been generated around the issue of innate cognitive gender differences, which in turn has had profound social and political implications. Mental functioning relating to language development, logical and spatial reasoning, locus of control, and achievement motivation have all at some time been studied with a view to finding a biological/genetic explanation. This is an extremely large field of study, and thus only a summary review can be provided. However, a particularly important area is the research which reflects the long held assumption that males and females have different hemispheric organisation, as a product of different hormone function and maturation rate. In the past, when some sex differences have been reliably found, they have been often interpreted by lay readers from a overly simplistic sociobiological standpoint. Others (e.g. Hyde, 1984; Caplan, MacPherson, and Tobin, 1985; Maccoby and Jacklin, 1974) have provided compelling arguments (reviewed in Chapter 2) that gender differences in such areas as verbal and spatial ability, because of their commonly small effect size and high variability and overlap, dramatically fail to explain the social status quo in terms of gender roles. This oppositional vein of research began in the 1960's and has examined virtually every angle of socialisation as a possible factor in the development of traditional gender roles and behaviour. This has occurred in the main areas of social learning theory and gender schema theory (Bem 1981). There has been an overwhelming amount of evidence presented (briefly reviewed in Chapter 2) which reveals powerful systems of social norms which shape, through reward and punishment, both the overt behaviour and self-concepts of children as they mature.

By taking an interactionist perspective within this debate, this research is attempting to identify gender differences in verbal and non-verbal behaviour which may eventually prove to have innate, biological origins, yet which may also be part of a highly variable system of social interaction and learning. Acknowledging the possible intractability of the nature-nurture debate in its polarised form, the intent of this research is to explore areas of children's communicative behaviour in which important gender differences may exist; and to determine experimentally if any differences, whether socially learned or innate, do in fact affect the perceptions and expectations of adults. The thesis will explore the relationship that language

has with both the task at hand (task-mastery) and how it relates to the wider issue of social development, primarily by closely examining children's task-related verbal behaviour. The "task at hand," to speak broadly of problem-solving, is one area which has been a focus of research in gender differences for several decades. This area of study will be reviewed briefly in Chapter 2, and includes the research which since the 1960's has sought to explain how males and females perceive, and orient themselves toward, practical and formal problem-solving.

1.2 Developmental pragmatics

Gender differences in interactional style have been described as the social manifestation of both cognitive and motivational differences. However, in studying preschool communicative style it is important to consider language development itself, since verbal fluency may be a crucial functional constraint in a child's social repertoire. One essential skill that a child needs to become a mature communicator is the ability to negotiate meaning through subtle use of inference, implication and even irony. Although these devices seem rather non-utilitarian and sophisticated, they are essential even from an early age. Children must learn to appreciate meaning through the use of such linguistic devices as simile, anaphora, hyperbole, idiomatic expressions, etc. As stated by Becker (1988),

In order to communicate and interact effectively, children must acquire an array of pragmatic skills. They not only must learn to use arbitrary social phrases such as *please* and *thank-you*, appropriately, but they also need to learn more abstract discourse skills such as taking turns speaking and staying on topic. Children's pragmatic development is revealed in both the pragmatic skills they exhibit and their "metapragmatic" knowledge (p.457).

The study of pragmatics, including speech act theory, forms an important backdrop to the issues under investigation in this research. As branches of the philosophy of language, pragmatics and speech act theory were largely introduced by Grice (1957) and Austin (1962) and subsequently elaborated and developed by Searle (1964, 1969). A central goal of pragmatics is to provide a theoretical account of language comprehension which explains how people derive meaning from utterances using contextual cues and established social convention. The "meaning" of a speaker's utterance can be understood as an intended message which need not rely on the literal meaning of a combination of words. The field of pragmatics is extremely broad and ranges from the study of cultural idiomatic expressions (e.g. "trick or treat?") to expressions of convention ("please," "thank-

you," "excuse me," etc.) to very sophisticated use of implication and double meaning.

This area of research, which will be reviewed in Chapter 2, is integrally connected to social development because of the assumption (e.g. Schiffrin, 1990 and Becker, 1990) of a *social function* implicit within a speech act. Although on one level all language is by definition social, pragmatics attempts to account for social motivation or social conventional rule-following, which may be embedded within an utterance, and not part of its literal semantic content. Thus for example, commenting to someone, "nice weather isn't it?" though usually having only limited literal relevance, is an extremely common way of being socially engaging.

The speaker's meaning in such an utterance will, therefore, be highly dependent upon the social and cultural context. For most people conversing with each other, there is usually an automatic mutual understanding of context, and thus a seamless production and uptake of social messages and cues. When told "nice weather, isn't it?" adult listeners recognise a mutual understanding of the need to "break the ice" and rarely wonder what is the point of the comment. A large proportion of non-literal language fulfils social expectations of politeness. Thus, many such utterances can be very familiar, perfunctory and ritualised. Others however, carry non-literal meaning that can only be understood in one very specific context, and might depend on everything from the time of day, the place, situation, and even the personal history of the people conversing. What is essential in understanding the pragmatism of a speaker's words, is a mutual understanding of the immediate context. Mey (1993) in reference to the study of pragmatics humorously characterises it by asking: "What does an individual utterance end up meaning, when considered in its total context? . . . [I]s a particular request (e.g. 'asking for a match') really a speech act of 'asking', or maybe a come-on remark, a plea for human understanding and sympathy or a prelude to armed robbery?" (p. 251.)

For this research this issue of context will be explored with regard to discourse between adults and young children. The problem-solving setting has been chosen because it is a context which may have particular importance educationally and developmentally. Firstly, problem-solving will always entail some measurement of performance, whether in a formal way, for example as part of school assessment, or as an informal perception on the part of the adult, or as an awareness of achievement within the child. That is to say, no matter how playful and informal a problem-task is, there will naturally be at least an awareness within the

participants of how well the child has "got on" and how well the problem or task has been resolved. A key aspect of this research is to study children's task-related communicative behaviours and evaluate their relationship with objective measures of "how well they got on". Thus the experimental portion of this research will be to test the very meaning of "problem-solving" as a context constructed in the mind of the adult and the child.

1.3 Problem-solving and help-seeking

A central research question related to pragmatics is how well will the child's apparent understanding of the context match up with the adult's perception of the context, thereby affecting the true "meaning" of the child's utterances? The ability to answer this question will rely upon clues observed in the relationship between task-related language and actual performance on the one hand (Studies 1 and 2, Chapter 4), and the study of adult evaluative interpretation of the problem-solving task on the other (Study 3, Chapter 8).

This research will focus on a broad, yet salient, aspect of problem-solving, which is the amount that children *appear to ask for help*. "Help-seeking" is an area of communication that is also well represented in social and developmental research. Many studies have explored this behaviour in regard to its adaptive function in a child's growing repertoire of learning skills (e.g. De Cooke and Brownell, 1995; Nelson Le Gall, 1981). Help-seeking has often been discussed within the framework of children's *effectance motivation*, referring to supposedly innate knowledge-seeking and desire to understand one's environment (Harter, 1978). The relevance of this early motivation to linguistic research is discussed in Section 2.11 within the subject of the form and function of children's questions and requests.

Other work has examined help-seeking as a mediating factor in observer perception, both positive and negative. It is an area of language which can be considered part of a constellation of behaviours in the educational setting which has been recognised (Barnett et al, 1989) as charged and very salient, and has been drawn into discussion about locus of control, self-reliant behaviour, learned helplessness, and even compliance. How "help-seeking" behaviour will be perceived and interpreted by adults will of course depend on individual contexts, a fact which is reflected in the contrasting studies which have at times aligned it with dependency and helplessness (Maccoby and Masters, 1970; Heathers, 1955) and at other times with highly strategic, adaptive functioning (Nelson Le Gall and

Glor-Scheib, 1985). As described earlier, this research will focus upon male and female task-related help-seeking because it may be a potent cue; yet *what it is a cue for* at any given moment may be very problematic, both for the researcher and for the practitioner in education.

1.4 Adult-child interaction, social motivation and intersubjectivity

The research of the past two decades exploring the intersubjective nature of some parent/infant interaction has revealed the potential for highly synchronous, and surprisingly early mutual communication. The work of Dunn (1988) for example, has discussed evidence for mutual understanding of intent even among very young infants and mothers. Others have revealed interpersonal awareness through the imitative behaviour of neonates (Kugiumutzakis, 1985; Meltzoff and Moore, 1983). One central assertion made by virtually all researchers examining adult-infant interaction is that the driving force behind language development and eventual integration into the world of signs and symbols is an innate motivation to be social. This "hard wired" sociability manifests itself in mother-voice recognition, proto-conversation, turn-taking and voice/gesture synchrony which according to many psychologists (e.g. Trevarthen, 1992; Halliday, 1975) can be detected from birth. A review of this research (Chapter 2) reveals that a recurring theme in adult-child intersubjective communication is *mutual understanding of context*. Intersubjectivity and pragmatics theorists define the context of communication to be not only the external setting and situation, but also all the needs, expectations, and motivations of both the speaker and the listener¹. Thus any vocalisation, whether uttered by a pre-verbal infant or preschooler, can have embedded within it previous experiences, expectations and, as now argued, hidden social agendas. These internal cues, although perhaps masked by the social constraints of the setting are still part of this definition of communicative context.

It is not surprising that the phenomenon of adult-infant intersubjectivity, defined as shared meaning (often on an emotional level) is mainly a phenomenon occurring between parents and their own infants and children. Much less research has examined communicative relationships in non-parent/child pairs. Although most teachers will be good at remaining aware of individual children's communicative intentions, research on developmental pragmatics and intersubjectivity only

¹ Pragmatic theory also encompasses the *linguistic* context of speech or text, which informs the meaning of utterances through words occurring previously, as in anaphoric constructions.

discusses *parents'* intimate understanding of the child's construction of context which may depend on long-term contact and familiarity with that particular child (Trevvarthen, 1979). Thus adult/child intersubjectivity will not be a forgone conclusion in a busy educational setting.

One early aim of this research, therefore, was to identify areas in which language could be prone to mismatches in adult-child understanding. These mismatches may arise out of the teacher's limited opportunities for intimate understanding of the child, and the child's own early efforts in accommodating and understanding expectations of the adult. This may be part of the child's growing "theory of mind" and appreciation of others' intentions and expectations. The pilot work for this project, discussed in Chapter 3, re-examined some trends found in earlier work, which concerned children's help-seeking behaviours. Girls were observed to use more help-seeking utterances than boys during a problem-solving task, which suggested a gender difference in either ability or confidence. Neither possibility was supported however, as performance was equal between boys and girls, no fewer boys failed to complete the task, and no overt differences in eagerness to participate were observed. The initial perception of either ability or confidence differences revealed this communicative setting as a potentially problematic one, in the sense described above. It may be problematic because a child's (problem-solving) speech act and its understanding by an adult listener will need to successfully cross through a complex intersection where social motivation, nascent "theory of mind" and language converge. It seems likely that adult comprehension may often require "translation" which appreciates that the child's construction of the context may be very different from their own. Gender, as the literature suggests, is one important factor affecting language, and will be explored in this research as the main variable in the study of adult-child communication in a problem-solving context.

Much of the literature on developmental pragmatics (Ochs-Keenan, 1983; Schiffelin 1990; Snow, Perlmann, Berko-Gleason and Hooshyar, 1990) and virtually all the literature on intersubjectivity suggests that infants are endowed with an innate proclivity for social interaction, and for many (Trevvarthen, 1979, 1994) this social motivation is considered *the* uniquely human prerequisite for language development itself. These two areas of research, and the extensive research on gender and cognition have informed the research questions and experimental work for this study and have later provided a framework for the interpretation of the findings.

1.5 Overview of thesis

The experimental work forms the core of this thesis, which was intended specifically to study children's problem-solving communication and to explore systematically the relationship that task-related verbal behaviour has with actual performance. Several other important issues surround this type of inquiry, shaping both the research questions and experimental design, and also creating a framework for drawing inferences from the findings. These are summarised below.

- The research begins by reviewing what is known and assumed about how males and females may differ in respect to cognitive abilities, their style of social interaction and their roles in society. Some of the better known classic studies will be reviewed in Chapter 2, with the aim of taking stock as to where the "nature/nurture debate" has taken us, and to make a case (as others have) for a fundamental category confusion, when argued polemically.
- The intent therefore, will be to draw attention away from the (circular) debate about primary causation in gender differences, and focus on how differences may shape adult-child interaction and possibly colour, if not fundamentally drive, adults' attributions of communicative intent. The review will discuss research which has examined the *problem solving* context, ubiquitous in the educational setting, and recognised by many researchers and teachers as being particularly salient for both children and adults. Indeed, it may follow logically that any context of intellectual struggle will be most important for the formation of later achievement expectations, both for the children and adults around them.
- Much past research has attributed fundamental motivational differences to males and females, pertaining to achievement and sociability respectively. A review of recent literature indicates that this traditional attribution has been, at best overly facile, and at worst, divisive and politically expedient. One problematic area may be how adults in general may draw a distinction between being social and being task-oriented. For the problem-solving child the distinction may be blurred, and possibly irrelevant, especially in light of the case made for innate and omnipresent sociability in infants and children. This issue will be addressed by reviewing language development research, including that which may best tackle the problem of early speech and meaning: developmental pragmatics. This area will become central to the aims of the research in terms of critically assessing what is assumed about

early language abilities, and more specifically what can be assumed about speech acts in the problem-solving setting, particularly those which ostensibly indicate desire for help and dependency.

- Experimentally, the aims of this research will be addressed by focusing on one narrow area of children's language: that which occurs in connection with the solving of a challenging problem. The study of child language in a *dyadic* setting was chosen partly for methodological considerations, but also in order to mirror the type of interaction where evaluative attributions might be most sensitive (as opposed to a more busy group setting). Children's on-task utterances will be coded and analysed primarily with regard to the child's self-presentation as being either *apparently* help-seeking or neutral/self-reliant. The analysis will also include an examination of the orientation of the children's on-task utterances. This is defined as the grammatical categorisation of *about whom or what they are talking*. The third major analysis will be coding of the children's utterances on the basis of their form of speech as either declarative, interrogative or imperative. These areas of analysis are the focus of Studies 1 and 2 because of their interconnectedness, insofar as social meaning will emerge as a combination of these three aspects of language use.
- A final yet central aim of this research was to test directly the effects that help-seeking, as one *apparent* dependency sign, may have on adult attribution of performance and ability. The study of adult interpretation of these speech acts (Chapter 8) was intended to pit objective parity of problem-solving performance against differing levels of apparent help-seeking. This follow-up study also served to test the validity of the coding system from which the concept of "help-seeking" derived.

The topics discussed in this introductory chapter provide the main framework within which the theoretical and experimental agenda of this research was developed. However several sociological and philosophical issues will be introduced in the literature review (Chapter 2) which are tangential to the central experimental aims, yet were considered indispensable to the larger discussion of how cultural and scientific traditions have shaped research relating to gender and language. As will be argued, the study of gender differences has been significantly shaped by political forces, particularly the feminist movement. Political agendas have, in both positive and negative ways affected the objectivity of scientific research. Speech Act Theory, as one important treatment of language meaning,

has been introduced for its relevance and usefulness to the discussion of children's developing pragmatic skills in language. Also addressed in Chapter 2 is the issue of traditional philosophical problems associated with studying any behaviour which occurs within a social context, problems which were essential to remain aware of during the methodological design stages of this research.

CHAPTER 2 SEX AND GENDER, LANGUAGE, AND SOCIAL DEVELOPMENT

2.1 Chapter overview

As introduced in Chapter 1, this research is focused on preschool children's problem-solving communication. Of primary interest is verbal behaviour that is relevant to two pervasive gender stereotypes. One well supported stereotype is the constellation of communicative motivations that are loosely categorised as affiliative and cooperative (and used to characterise female interactive style, in contrast to masculine competitive styles). The other stereotype is the more disparaging, but widely held, concept that females display lower self-confidence, achievement motivation and expectation, relative to males. As pointed out at the end of Chapter 1, the central research aims of examining children's language development and style of communication has implicit and important connections with more abstract sociological and philosophical discussions. These are addressed throughout this chapter as they become relevant to the formulation of the final research questions, which are summarised at the end of this chapter.

The study of gender differences has a particularly politicised history which for many years, and to this day, has been dominated by debates about the role of learning vs. genetic factors in the formation of gender roles, particularly with regard to the possible gender differences in verbal and spatial ability. Cognitive ability differences have often been the nexus of debate from which gender roles were extrapolated. Thus, prior to the discussion of issues in communication and motivation, a brief account of the socio-political aspects of gender differences will be presented, so as to place the current research in an historical context.

There is research reviewed in this chapter which has, since the late 1960's, indicated lower achievement motivation and expectation for females. As mentioned above, there are models of language which are commonly discussed as male and female-specific and typically are generalised as "competitive" and "affiliative" respectively. One central issue raised in this literature review (and experimentally, within one particular context), is the way in which differences in *apparent* achievement expectation and style of communication, may reinforce the perceived validity of the

other. That is to say, the readily apparent differences in communication styles (cooperative, deferential, often self-effacing among females), provide salient cues which may reinforce the general image that females have an intrinsic **social** motivation which overrides both desire for task-mastery and expectation to achieve in problem-solving settings.

Research conducted in the past five to ten years, which has questioned the traditional view that females have lower expectations for success, will be discussed. Some of this work has critiqued the *type* of achievement/problem-solving setting, suggesting that past research has been biased by gender-typed tasks. Others have tried to re-evaluate "confidence" and "achievement expectation," etc. by examining the different ways males and females communicate. The latter is of particular interest in this project, because a dilemma which plagues most social psychological research (and indeed, everyday language interpretation) is the fact that the majority of conclusions must be drawn from language data. Research purporting to show achievement motivation and expectation differences often must rely on language-based data (from audio/videotapes, self-report, etc.) that derives from less than naturalistic settings. In the case of achievement motivation and expectation research, some studies in the past have relied on standardised projective tests, questionnaires and personality inventories, other have draw conclusions based upon task persistence, or combinations of these. Thus, one central aim of this study, raised in Chapter 1, is to critically examine the validity of making attributions about confidence and achievement expectation by looking at language as it occurs spontaneously *during* the solving of a challenging problem.

The importance of studying early gender differences in communication, in order to examine *true* levels of confidence, independence, etc. is both obviated *and* made difficult by the uncertainty about what young children are linguistically capable of. Thus a considerable proportion of this chapter will focus on language development itself, since any gender differences in verbal behaviour may be a function of both *inclination* (genetic or otherwise) and of relative *ability*. Of particular importance to the larger issue of "meaning" in children's problem-solving communication is their pragmatic language ability. The literature discussing pragmatic development (itself a focus of considerable dispute) will be reviewed, along with a discussion of conceptual and philosophical problems associated with trying to contextualise speech acts, especially those of young children.

This chapter concludes with a review of research which specifically examines the form and function of children's social and help-seeking questions. A primary focus of the experimental work in this project is to study help-seeking in relation to task-ability. Thus, theoretical perspectives on the pragmatic elements of requesting will be of importance in interpreting behaviours of very young children in this study.

2.2 Gender roles and society: a socio-political digression

As with most areas of research which exist within a socially charged climate, it seems essential to back away momentarily from the more focused discussion about the purely psychological (i.e. cognitive, developmental) discussion of sex differences and language and attempt first to take a more macro-oriented view of the social and political issues which permeate all levels of "objective" scientific inquiry on the subject. In this section an attempt is made to scrutinise briefly the relationship that the women's movement in general has had with the gender and language research with which it grew from the mid-1960's. It is ultimately important for the discussion of gender roles to take account of what exactly has been disputed, because the territory, psychologically speaking, where important conflicts have been pitched, has clearly not remained the same. Arguments regarding sex-differences have centred at times around maturation and hemisphere lateralisation and the spatial/verbal ability issues, and at other times around the primacy of either social learning or genetic influence. Some gender research has tried to understand behaviour and gender roles within a social-cognition model. However, one heuristic which generally holds true, is that most of the research directly critical of traditional gender roles, or used to support arguments against innate gender roles, have tried to demonstrate the many ways in which gender roles may be social artefacts. This approach in the recent past has concentrated on how sex differences had always been presented as the reason for *gender roles*. Thus for progressive change to take place an uncompromising denial of substantive differences was adopted (e.g. Zimmerman and West, 1975). As described historically by Cameron (1989),

The description and explanation of gender differences, not only in language but in any sphere whatever, is not a straightforward enterprise; with the emergence of a feminist perspective in the academy as well as outside it, the topic has been rapidly and explicitly politicised. We must remember, of course, that to feminist minds it always was implicitly a political question. For sex - like race - is an area of social relations where *dominance* has

invariably been justified by *difference* (p 6).

As described in the previous chapter, gender research, until approximately a decade ago, was heavily dominated by work which seemed to be conceived and executed for entering into the socially and politically charged sex-differences debate. One need not be a sociologist to acknowledge what was (and perhaps still is) at stake for the women's movement. The seminal work of Mead (1935), Maccoby and Jacklin (1974), Hyde (1984), Fagot (1977), Fagot, Hagen, Leinbach and Kronsberg (1985) and many others set the tone for a mass confrontation with establishment psychology which was perceived as defending traditional human psychological dimorphism, sex-roles, and, in a more nebulous way, "traditional" family values. The greatest amount of research of this type occurred in the 1960's and 1970's, but represented a culmination of growing criticism of the out-dated and highly dubious "scientific" rationales for traditional gender roles. Social learning theory was to benefit greatly from the absurdity of some scientific and medical explanations for male intellectual and professional dominance, which had collected like dust since the Victorian era. A favourite example cited by modern social scientists (e.g. Spender, 1995b) is the medical opinion expressed in a late 19th century issue of *The Lancet* which warned that female intellectual activity would atrophy the womb, and burst the brain.

Social learning theorists, a category in which the above researchers all very loosely fit, were focused on, and successful at, pinpointing the myriad channels through which socially "appropriate" behaviour is transmitted to infants and children. Cumulatively, their thesis was that from birth, children are not merely instructed to behave in certain ways, but are thoroughly immersed in an uninterrupted flow of cultural values, not least the steady current of modelling, reinforcement and punishment, conscious and not, which sweeps every child in the direction of their eventual gender identity. This early body of work, some of which will be reviewed in this chapter, can be characterised as being uncompromisingly dedicated to the position that any *important* gender differences must be a product of learning. To concede any innate differences, especially in interactional style, would be unthinkable; because to allow even a chink in the overall argument, would give the competing model of innate gender differences the means to render all their findings merely descriptive of social roles, rather than presenting the causal mechanisms. This stance has evolved considerably, with the enormous diversification of psychology, which in recent years has become informed by sociolinguistics, sociology, even social-evolutionary psychology (Small, 1995).

Wertsch in 1991, in reference to approaches to the study of "mind" asserts,

By choosing to focus on either universals or sociocultural situatedness, one makes certain essential assumptions about which phenomena are interesting and deserve attention. The existence of these assumptions and their implications are not often appreciated, however, and the result has been endless misunderstanding and bogus argument. Since there are undoubtedly universal as well as socioculturally specific aspects of human mental functioning, the choice here is not simply one between sound and misguided sets of assumption; rather, it is a choice between two different research agendas, both of which need to be addressed and, where possible integrated (p. 7).

Within this thesis, an integrative approach has been attempted when discussing the issues regarding children's style of communication. Specifically, there is an interactionist position taken with regard to the possible gender differences in language ability and use and a greater focus on how any differences might be interpreted and possibly reinforced throughout the educational experience.

2.3 Gender and cognition: visual-spatial vs. linguistic debates

Maccoby and Jacklin's (1974) review of the literature conceded extensive support for some gender differences in intellectual aptitudes. Once their landmark review of gender research had been published, the male spatial reasoning advantage and female language advantage was one of the few substantive gender differences left standing. In 1980 Benbow and Stanley's published their study that appeared to have been one of the milestones in the discussion of sex differences. Using a pool of completed Scholastic Aptitude Test scores, they found in all tests of maths ability, boys performed better than girls. This was reinforced with findings in later studies (Benbow and Stanley, 1980, 1983). Studies like these are generally stacked together with the classic brain lateralisation research such as Kimura's (1969, 1992). Her oft-cited studies have claimed that greater hemisphere lateralisation for a given ability, such as spatial reasoning, will be associated with more efficient processing in that area. Females are believed to be less lateralised for spatial ability, which has often been used as the explanation for gender differences in performance.

Findings like these were generally countered in two ways. One was to argue that observable differences were either too small, or that they appeared too late developmentally, to explain the magnitude of social inequity regarding gender. In

regard to maths and spatial abilities, the observed differences have had an age effect. A male advantage in spatial performance appears around ages 6 - 8, according to Harris (1978) and McGuinness and Pribram (1980). Maccoby and Jacklin (1974) also pointed out that research consistently showed an onset of a male advantage in spatial performance only in middle childhood. The consistently reported age at which measurable differences in spatial and maths abilities seem to appear, was only the beginning of a more generalised apprehension towards these alleged differences. Males' superiority in these fields has not been shown to be robust before the pre-adolescent years; but also the very existence of meaningful differences in ability has been very strongly argued. One very lively debate, published in *American Psychologist*, was initiated by a research review by Caplan, MacPherson and Tobin (1985) which sharply criticised the research claiming to show sex differences in verbal/spatial ability. Citing such works as S.D. Porteus' "Porteus Maze" study (1965), they pointed out that the reported differences in ability were "trivially" small, inconsistent and are not reliably measured before the teen years. Indeed, they even questioned the objectivity of the researcher himself who, they pointed out, first started conducting research in the 1920's through the 50's and 60's before important illuminating research had been completed, implying that he was inevitably biased by previous-generation social conservatism.

They also argued that a systematic under-representation of "no-difference" findings (similar to Rosenthal's (1991) "file-drawer" problem) skewed the literature, and that previous studies made systematic errors by considering "spatial abilities" to be a unitary construct. As put by Hiscock (1986), "Caplan et al. provided ample reason why psychologists should avoid promulgating the simplistic generalisation that males are globally superior to females in spatial abilities." (p. 1011) The review was rebutted by several researchers (Eliot 1986 and Halpern, 1986) who countered with assertions regarding the great consistencies of the positive findings across studies and criticism of Caplan et al.'s opinion of "trivial" regarding gender differences. Burnett cited Maccoby and Jacklin (1974) who reported that male advantage on tests of spatial ability increases during the secondary school years up to approximately .40 of a standard deviation. He asserted that this difference was considerable and objected to Caplan et al. regarding 1/4 to 1/2 a standard deviation as quite small. Moreover, researchers studying gender differences in brain lateralisation, which appear to manifest themselves in the relative linguistic and spatial strengths of each hemisphere, can lay claim to highly reliable gender differences. These differences, it is argued, stem

from maturation rate, which in turn is a function of the presence of male or female hormones. Because it is thought that the right hemisphere (with a spatial/mathematical advantage) matures more slowly than the left, and that females finish maturing sooner than males, they have less right hemisphere specialisation for spatial function (i.e. more diffuse processing of spatial information). It is thought that greater specialisation, at least for spatial reasoning, yields greater performance on actual tests. Performance differences in spatial and verbal reasoning tasks between males and females are so easy to obtain, that such experiments have become standard in many undergraduate psychology laboratory classes. The point of contention however, is the role of genetic, hormonal influence vs. the role of differing levels of social reinforcement males and females receive for spatial and linguistic learning.

There is, however, a counter-argument for nearly every study purporting to show a significant sex difference. Hyde (1981) re-examined the differences in verbal vs. maths ability, and concluded that sex differences tend to account for no more than 1% to 5% of the population variance and reiterated the point that the difference in means is only about 1/4 to 1/2 of the standard deviation. These and other researchers argue the differences are too small to account for the discrepancy in social life. As discussed in Chapter 1, reviews such as Nicholson's (1984) and Lenney's (1977) raise the issue of proportional effect by pointing out the large discrepancy between alleged cognitive gender differences which are relatively small, and the actual representations of men and women in various professions. Other research even questions the design integrity of the studies showing sex differences. Jacklin (1989) reviewed Benbow and Stanley (1980, 1983) arguing that they reported a massively significant sex difference in maths ability, and proposed biological explanations, though no portions of the actual study are concerned with causal explanations. Additionally, she points out that Benbow and Stanley used a sample from upper-middle class schools who, as part of their entrance requirements, include very high verbal abilities or high maths/spatial abilities. Thus testing for sex differences may really only have revealed the polarities already inherent in the schools, but not in the public at large. In a further critique of this landmark study, Jacklin (1989) presents evidence which attacks the nature in which Benbow and Stanley had provided conclusions about the role of biology in the observed sex differences. It was, they remarked, a very well known study, read in the popular press by a great many lay-people. They found that "uninformed" mothers (those unaware of the study) had *equal* opinions of their son's and daughter's maths ability whereas "misinformed" mothers, those aware of Benbow

and Stanley's study, believed their daughters to have greater difficulty in maths. Other studies throw into question, if not the existence of real differences, at least the stress one should place upon them in studying gender roles. Bethencourt and Torres (1987) examined differences in maths problem-solving ability among 527 female and 551 male children from the 2nd through 8th grades (approximately ages 7-15). They reported that only at the 8th grade level did boys outperform girls in maths problems. Interestingly, differences in maths performance appeared to be correlated with cultural factors and parental expectations. Thus an argument made by social learning theorists was that if intellectual aptitude differences cannot be reliably detected before early adolescence, then they may indeed be a function of parental and social input.

Even in more recent research the findings regarding gender and spatial, verbal and mathematical reasoning remain contradictory. Young and Wilson (1994) for example did not find any significant gender differences in the areas of matching ability, spatial memory, and ideational fluency, which other research (Kimura, 1992) asserts are skills which are more developed in females. Johnson and Meade (1987) assert that a male advantage in spatial performance can be reliably detected by the age of 10 and that this remains consistent through age 18. Hemisphere lateralisation research (e.g. Kee, Gottfried, Bathhurst and Brown, 1987) has also continued to yield gender differences in neurological organisation.

One common criticism of mathematical reasoning differences showing male advantage was that the tests usually used word-questions whose content was gender biased in favour of males. This possibility was tested recently by Chipman, Marshall and Scott (1991) who did not in fact find any main effects due to the wording of maths problems. Wording effects in maths ability were also studied by Sappington, Larsen, Martin and Murphy (1991) who also failed to find any significant difference in male or female performance due to the familiarity of the problem content. Moreover, they found a significant male advantage across all conditions of wording (male biased, female biased and neutral).

This small representative sample of the recent literature reflects the persistent dichotomy in opinion about both hemisphere lateralisation in general and cognitive aptitudes specifically. They are discussed here for their relevance to expectations about gender differences in achievement expectation and confidence. Given the many

research examples representing both extremes of opinion (and all those in-between), one might expect to find a similar amount of disagreement on the subject of relative confidence, achievement expectation and task-mastery. These areas of cognitive functioning and "affective self-appraisal" are likely to represent areas of highly complex interactions between genetic and environmental influences. Most researchers and laypersons are aware of this on the more obvious level of input where innate and environmental factors are summed to produce individual characteristics. However, the picture is further complicated by the possibility for environmental factors actually coming to bear on the physical development itself. Halpern (1992) for examples cites research (Petersen and Hood, 1988) which has demonstrated that neural organisation can be significantly affected by the type and degree of stimulation. Animal experimentation with rats (Diamond, 1988) in which some were reared in rich, stimulating environments and others in impoverished ones, yielded differences in cortical thickness, cell size and dendritic complexity. Halpern rather aptly describes the relationship between nature and nurture as "...siamese twins who share a common heart and nervous system. The technology has not yet been developed that will allow them to be separated." (p. 5)

2.4 Confidence, achievement expectation and language

Concurrent with much of this research has been the inquiry into the ways males and females perceive their own abilities, and those of others. As with the study of cognitive ability differences, there has been a great deal of research, showing that women and men have naturally lower expectations for female performance and that women are more prone to seeking approval at the expense of mastery of a given skill or task. Horner's (1972) female fear of success argument is very much relevant to this body of work. According to the theory, women perform academically and professionally below the level of men, because to compete and succeed in traditionally male areas "does not compute" with the feminine sensibility, which by nature was thought to be cooperative, compliant, etc. This quasi-cognitive argument proposes that "fear" is an automatic mechanism which is activated presumably when a woman transgresses the invisible boundary between being supportive and affiliative and being ambitious and competitive. It was thought that for females success, or the contemplation of success, in mixed-sex competitive environments are incompatible with an intrinsic imperative to *compliment* the male social role, in a very broad sense: socially, emotionally and professionally. Although this theory was contentious when

it was published, Bardwick (1971) paraphrases Margaret Mead who, as early as 1942, said that in our [western] culture boys are unsexed by failure and girls by success.

Maccoby and Jacklin's (1974) review makes an authoritative argument that women do indeed display lower self-confidence, described as lower performance expectancies and self-evaluation of abilities and that women are more prone to demonstrating learned helplessness. Brem and Johnson (1989) conducted a study that examined the effect of a subject's sex and sex role attitudes (using the Bem Sex-Role Inventory) on expectations for achievement. They analysed the relationship between sex-role orientation, gender, problem solving appraisal and coping style, and reported that masculinity and maleness (as two separate constructs) were correlated with higher self-appraisals of problem solving ability and willingness to approach problem solving situations. Many studies seem to reveal women as believing less in their abilities, particularly in the sciences, computing and pure maths fields, when their actual achievement is most frequently on a par with males (Nicholson, 1984; Archer and Lloyd, 1982; Skaalvik, 1990; Coates, 1987; Denno, 1982). This paradox lends weight to the concern that too much significance may be placed on the hemisphere lateralisation and spatial/verbal performance data.

The information technology revolution that we are witnessing presently, particularly in relation to the internet, and networked computing in general, may be particularly pivotal for individuals' academic and career achievement in future years. For many (e.g. Spender, 1995b) there is serious concern over the fact that many of the apparent gender differences in confidence and achievement expectation reported in the past have re-emerged within the arena of computing. She cites examples of male/female proportions for internet use ranging from 75% to 95% in favour of males. The degree of male dominance in networked computing has always been in dispute mainly because of the relative anonymity of the internet. However, her school-room observations have revealed a recurring theme of female avoidance of computers in general, where the most commonly expressed reason is lack of confidence and competition with boys.

Turkle (1988) has examined the emergence of computing since the 1970's and commented extensively on how males and females have responded in very different ways. While Spender warns of girls and women suffering from competition with

males, Turkle's thesis is that women have an intrinsic mistrust of a technology that demands a quasi-human relationship. Boys and men, she argues, see computer media as an endless domain with promise of risk and excitement. It is, she writes, "a medium that supports a powerful sense of mastery." (p. 42) Girls and women witness the "relationship" that males achieve with computers and are commonly put off--seeing this as antisocial and even "dangerous." Turkle points out, however, that common stereotypes about computer use stem from the image of the male "virtuoso hacker" and that both men and women have a great deal of common ground in both the desire and capability to problem-solve and create with computers.

The emerging literature regarding younger children and computing appears to indicate that mixed-gender pairings can be disadvantageous, not because of intrinsic confidence differences, but rather as a function of differing styles of interaction. Fitzpatrick and Hardman (1994) report that same-gender pairs tend to outperform mixed-gender pairs on a computer based language task. Their analysis of interactional styles did not in fact reveal the gender differences commonly reported in the literature (e.g. females as cooperative and negotiative and males individualistic and competitive). What was found was more frequent *assertive* behaviour in general with mixed pairings, which rendered the joint effort as less focused and coordinated.

2.4.1 Confidence and locus of control

The phenomenon of apparently lower female achievement expectation has been explored extensively through work on locus of control. This type of research most often occurs within a cognitive framework, and implicitly suggests innate mechanisms, in answering the question as to why these differences exist. Early formulation of the locus of control theory (Brisett and Nowicki, 1973, Rotter, 1966, 1975) describes it as the level to which an individual ascribes responsibility for success and failure to external forces/constraints vs. internal self-determinacy. This has historically been important in assessing women's perceived abilities. In terms of beliefs about one's own ability, along with differential expression of locus of control and, finally, overall communicative styles, there seems to be sex-differences which appear within the childhood years spanning the preschool to pre-teen years.

The discussion of "belief about one's abilities," without overly consolidating constructs, involves confidence levels and self esteem. Research commonly indicates

lower female achievement expectation. Robert and Noel-Hoeksema (1989) present evidence that females are more affected by evaluative feedback, particularly negative feedback. In a study using self-reports, women were found to be significantly more affected by negative performance evaluations than their male counterparts.

Children's beliefs about their abilities, or their "expectational set" (Rotter, 1966) or "performance expectations" (Entwisle and Baker, 1983) is an area of study closely related to locus of control research. Using naturalistic observations, Frey and Ruble (1987) examined sex and age differences in self-evaluations of performance, along with estimates of attribution for performance. Their subjects ranged from kindergarten through 4th grade (approximately ages 5-9) and were observed in routine classroom activities, and then individually interviewed. A central tendency was that females made more negative attributions and self-evaluations than males. Similarly, in the Entwisle and Baker study (1983) involving over 1000 children of the 1st, 2nd, and 3rd grade (approx. ages 6-8), evidence was found for differential expectations for performance between males and females. They interviewed the children and their parents in the period prior to issuing of report cards for each marking period, and recorded the marks. In every grade level the parents believed boys to perform better in maths, and girls better in reading. The children held similar beliefs. Analysis of expectations and actual results produced very interesting findings. Both sexes' estimates for performance in reading were in line with their actual performance. However, while the girls reached parity with boys in maths performance, their self-estimates were lower than boys', and so were their parents' expectations. Furthermore, the boys' expectations were overestimates of their actual abilities which, again, were paralleled by their parent's estimates. Locus of control research which is relevant to these findings, is sparse with regard to young children. One finding however, is that internal locus of control seems to be more a function of gender-schema (generally measured using the Bem Sex-Role Inventory, 1981) than of biological sex. Viaene (1979) for example, found in an anagram solving experiment, that females scoring high on femininity tended to attribute failure to intrinsic lack of ability, whilst males measuring high in masculinity tended to attribute causes of failure to task difficulty. Maccoby and Jacklin (1974) present findings with a similar pattern, but assert that the effect does not reliably appear until adulthood.

These studies discussed above give some indication of the diversity of contexts in which gender differences in achievement motivation and expectation have been

alleged. Many, however do not specifically address children's language as a source of information about self-expectation, motivation or confidence. The need to examine language use *within* an active problem-solving setting was one impetus for the experimental design of this research, the specific question of whether there are substantive differences in the expression of confidence and achievement expectation.

2.4.2 Adult attributions of achievement expectancy and ability

Adult attributions of children regarding ability and their possible link with compliant behaviour are described in other research. Gold, Crombie and Noble (1987) found that teachers hold sex-contingent beliefs about ability. Their evaluations of girls' competence was predicted by *compliance*, where girls who were perceived as more compliant were viewed more *positively*. They report that these girls are reinforced for compliant and acquiescent behaviour since they tend to receive higher grades than other girls. A question they do not address however, is whether higher grades occur as reward for "good behaviour" or truly reflect judgements of intellectual ability. Judgements of boys' intellectual ability, in contrast, was found to be predicted only by age and IQ. Behaving in a non-compliant way did not prejudice the opinions expressed about their intellectual ability. Gold, Crombie and Noble point out the possibility that effective problem-solving is often later associated with *independent* behaviour and that girls are socialised away from displaying problem solving independence. An earlier study by Crombie (1984) indicated that preschool boys and girls rated by their parents as less compliant were found to be better at independent problem solving. A concern this raises is what effect a teacher's underlying expectations will have upon a child over time, especially considering the reinforcement girls receive for compliant and dependent behaviour (Fagot and Hagan, et al., 1985) along with deferential language use (Coates, 1987; Brown and Levinson, 1978).

Gold et al.'s studies involving perceived competence, like other studies, may possibly relate back to issues about motivation. The "compliance" that they observed was a subjective estimate, derived from questionnaires completed by teachers (Gold, Crombie and Noble, 1987) and parents (Gold and Crombie, 1984). Typical items in the parent questionnaires included questions such as "If you were comparing your child to other children his or her own age, how disobedient is your child?" It would seem that these sorts of questions cannot distinguish between *types* of compliance; and one might argue that compliance is very often bound up with language. It is likely

to be defined in part (in the minds of parents) as cooperative verbal responses to parents' or teachers' requests and questions. Thus "compliance" may be a function of "good behaviour" but in a more global sense, it can be considered *socially* cooperative. As such, this generalised behaviour may feed-back into the traditional model of dichotomy: *feminine social motivation vs. masculine achievement motivation*. Boys are conventionally thought to be motivated to achieve primarily by their desire to master a task, compared to girls who operate out of a desire for social approval. Thus it has been commonly thought that when achievement and social approval conflict, girls will sacrifice achievement for more affiliative ends (Crandall, 1969). Van Hecke (1983), in an experiment pitting achievement (higher success probability choice) versus approval from experimenter in spite of lower probability of success, found that when reinforced for lower probability choices on a guessing game, through social approval, girls more often sacrificed achievement (success) for experimenter approval: e.g. "good guess." Boys pursued the more probable options to maximise success on the task, ignoring reinforcement cues. However, when the reinforcement was taken away, girls performed as well as boys. Harter (1975) conducted a study examining mastery motivation. The finding was that boys persisted longer than the girls on an unsolvable task before giving up. The interpretation was that there must be some greater achievement striving among the boys. As for possible reasons for this difference, Gold, Crombie, Brender and Mate (1984) assert that girls and boys receive different levels of freedom of experimentation, such as opportunities to confront and resolve challenging problems, which for the girls may result in possible dependence socialisation. In a sample of 60 male and female children in a task/reward situation, they noted that girls were more likely to persist in following an adult role model giving incorrect procedural examples, thus failing to complete the task. The interpretation commonly drawn from such findings has been that girls' following the model is both socially affiliative *and* compliant. In fact with girls, cooperation (a construct commonly associated with affiliative motivation), was found to be correlated with self esteem (Ahlgren, 1983.)

2.5 Socialisation of achievement motivation and expectation

2.5.1 Putatively neutral pronouns and gender role development

Within the social learning theory model there are many researchers who have proposed causal explanations for the development of apparently poorer expectations

of performance among girls. The study of language use became of great concern. Gender-biased use of pronouns is one area of study (Gelb, 1989) which suggests that over-representation of male pronouns might influence children's overall beliefs about relative ability among men and women, and possibly their own. Gelb cites examples where teachers were found to use male pronouns three times more than female ones, when referring to a gender-ambiguous character. It was shown that both boys and girls significantly attributed maleness to each of three pictures presented as gender-indeterminate. Other research reports findings indicating socialisation of young children to see maleness as more important than femaleness. A very large review of the study of the male dominance expressed through language can be found in *Feminist Stylistics* (Mills, 1995).

Bem's Gender Schema Theory (1981) and others' previous models (Piaget, 1926; Marcus and Overton, 1978) asserts that preschool children's developing concepts of their "world" (physical and social environment) and their sexual identity (understanding of their place within a system of gender-norms) will occur in parallel with language development and operational thought. Similarly, Kohlberg (1966) and Kuhn, Nash and Bruckner (1978) have suggested that the understanding of gender constancy will reflect the development of operational structures for conservation. They report correlations between gender constancy ability and the appearance of phrases demonstrating understanding and preference for gender "appropriate" speech. A paper by Hyde (1984) reported that children who had heard gender neutral stories containing the pronoun "he" to describe the protagonist, believed them to be anomalous 19% of the time. In contrast, identical stories with the pronoun "she" were judged to be anomalous 28% of the time. In addition, children given a neutral profession and a reference to a person in the gender neutral phrase "he or she" and "they" still reported that a man was best qualified to do the job. However, it is still a matter of debate whether language use like this, and in general, is instrumental or symptomatic regarding the development of gender-role schemata.

2.5.2 Reinforcement of dependency styles

There is some research available which directly supports a model of dependency socialisation for girls and task-mastery for boys that may be reflected in the way children's requests for assistance are handled. Barnett, Sinisi, Jaet, Bealer, Rodell and Saunders (1989) cite research that has found differences in how quickly parents

respond to requests for help from their daughters compared with their sons, as well as qualitative differences in the type of help that is offered to children, with boys receiving help which encourages mastery orientation (e.g. clues to better approach a problem) compared with direct help offered to girls which they suggest reinforces dependent behaviour. They suggest that such socialisation pressures may also shape children's beliefs about who (males or females) normally ask for help more. They conducted a study in which children were read various stories about other children faced with a problem (e.g. opening a jar, finishing a puzzle, removing a splinter). They reported that 4 and 7 year old girls expressed a stronger belief than their male counterparts that a female character would seek help from a parent.

In further search of causal explanations for achievement expectations and confidence, Fagot (1977) examined three types of behaviour in preschool children: aggressive behaviour, adult dependency, and active motor behaviours, whilst looking for correlations with parents' behaviour. Boys were encouraged to play with building blocks and manipulate objects spatially, while girls were encouraged to play with soft toys and dolls. Most importantly, girls received positive reinforcement for asking for help, while boys received negative reactions when asking for help. Indeed, in most cultures it is much more difficult for a boy to admit explicitly to anxiety or helplessness over a problem than it is for a girl, as demonstrated in a review by Sutton-Smith and Rosenberg (1960). Gold, Crombie and Noble's (1987) study (discussed in Section 2.4.2) is especially relevant here as a discussion how girls, whilst perceived more positively by teachers when adopting compliant acquiescent behaviour, are perhaps being reinforced for more dependent problem-solving styles. "Dependency" certainly has strong conceptual links with help-seeking, although in reviewing the available literature, it is not easy to establish a link between help-seeking behaviours and adult perceptions of dependence. As mentioned in Section 1.3 help-seeking is perceived by *researchers* themselves as having both positive and negative aspects. Earlier research traditionally discussed help-seeking in a relatively negative light. Maccoby and Jacklin (1974), for example (pp. 191-200), present research findings which counter the female help-seeking stereotype, but place the concept itself within the discussion of dependency behaviours, that include among other things, proximity-seeking, clinging and even whining. More recent studies have discussed this behaviour as an essential skill which develops rapidly between the ages of 24 months and 3-4 years. According to Stipek and MacIver (1989), young children *increase* their use of help-seeking from the toddler years to later preschool years, and only around 7

years of age does the frequent "what" and "why" questions diminish. De Cooke and Brownell (1995), Nelson-Le Gall (1981) and others represent help-seeking as an essential skill which reflects intellectual competence rather than the lack of it. This interpretation is based on the assertion that a child must have a high level of understanding of a problem in order to be able to formulate effective questions and reach a solution. *Effectance motivation* is a commonly discussed general concept in which help-seeking is subsumed. Researchers (e.g. Harter, 1978) refer to effectance motivation as supposedly innate knowledge-seeking and desire to understand one's environment. This early motivation among children to intellectually master their social and physical environment is relevant to linguistic research (reviewed in Section 2.11) which describes the form and function of children's questions and requests.

Research examples supporting social learning theory can be seen in Mazur's (1987) study of mother-child dyads. She observed mothers imitating their babies and reported their interactions with sons as being dominated by non-language noise, whilst mothers' imitations of daughters revealed twice as many interchanges of *language-relevant* sounds. A study by Gleason and Weintraub (1978) reported that mothers of preschoolers had twice as many instances of non-assertive linguistic styles (e.g. tag questions, qualifiers and hedging requests) with their children compared with fathers and observed that fathers and male day-care workers employed more simple, direct requests than females. Similar parent-child interaction differences are reported by Berko-Gleason (1987). There are clear differences between bias which originates in the adult and comes to bear upon the child, as in the study by Mazur (1987) and Gleason and Weintraub (1978), and bias which is part of a more complex interaction that may begin with a gender difference among children, be perceived and interpreted by adults (possibly inaccurately) and reflected back upon the child in a evaluative judgement.

In an extensive review including literature on self concepts, Eccles, Kaczala and Meece (1984) point to the body of research on expectations and performance, where perceptions of sex appropriateness will eventually affect children's achievement behaviours such as task persistence and task choice. They refer to research that reports differences as task-specific, where female expectancy of achievement will be as high as males on "feminine" and "neutral tasks" whilst their expectation will be to do poorer on "male specific tasks." They go on to discuss the relevance of attribution theory which accounts for the sex difference in terms of attribution of responsibility: "that causal attribution patterns are related in systematic ways to expectancies for

future performance, to subsequent achievement strivings and to the affects associated with achievement outcomes." (p. 41) This theory proposes in essence that women view their successes as more a product of luck and their failures as products of their own lack of competence, whereas men exhibit the reverse. This line of research, along with examples of learned helplessness research (Deiner and Dweck, 1980; Cain and Dweck, 1995) has very close parallels with the study of locus of control (e.g. Gordon and Nowicki, 1981). Viaene (1979) found that adolescent girls expect less success initially, and when they unexpectedly succeeded, were more likely to attribute it to external circumstances such as luck, while attributing failure to lack of ability.

Dweck (1978) studied evaluative feed-back, and the effects of social cues on learned helplessness. She found that children who attributed failure on a cognitive task to internal, thus fixed, characteristics (which as discussed, are thought to be primarily girls) showed a propensity to continue to fail; and their performance decreased after failure was artificially introduced after a measure of success. Importantly, among these children, those who were given more realistic attributions of failure plus some encouragement behaved in a far more adaptive way. In a similar study, Gordon and Nowicki (1981) studied maternal and child behaviours in a dependency producing task (a relatively difficult jigsaw puzzle), as a function of children's locus of control. Those who demonstrated an internal locus of control, who attributed personal consequences to themselves, and felt in control of their own destiny, showed a higher level of self esteem; those with an external locus of control, who felt controlled from external factors, had a significantly lower level of self esteem. Though males and females appear equal during childhood, by adulthood significantly more women will be rated as having an external locus of control (Nicholson, 1984). However, the large amount of research (e.g. Brissett and Nowicki, 1973; Gordon and Nowicki, 1981) reliably able to demonstrate this effect falls short of causal explanations, or subtleties within the effect.

2.5.3 Perceived appropriateness and achievement expectation

The inferences drawn from these studies are contested by Lenney (1977) and others who assert that apparently lower success expectancies and motivation among females may be due to the demand characteristics of the situation, in which females desire to appear modest to the experimenter. This position holds that it is less an issue of intrinsic achievement motivation than an issue of sex appropriateness pressures and

protection of self-image. Lenney's (1977) review re-examined locus of control, and expectancy for achievement, and uncovered some important constraints in the model of female locus of control and achievement beliefs. For example, when tasks were presented as "sex appropriate for girls" they tended to have higher achievement orientations; and similarly, boys had higher achievement orientations when tasks were presented as sex appropriate for males. Another mediating factor was the presence and clarity of performance feedback. Where there was none, or minimal amounts, girls' attitudes displayed the typically observed low self-confidence (e.g. Julian, Regula, and Hollander, 1968). However, studies which test confidence levels *with* feedback i.e. pass remarks or fail remarks, revealed that women do not show lower levels of self confidence (Feather and Simon, 1971; Hill and Dusek, 1969). Overall the central tendency is that differences between the men's and women's achievement expectations are not particularly reliable, when the usual gender cues are absent. The instances when women's expectations and/or attributions were as high or higher than men's are very important, theoretically, suggesting that sexual differences in overall confidence is an illusory concept and that "confidence" is a highly contingent concept needing clarification for the situation and context.

Research presenting "learned helplessness" as a monolithic construct has received similar counterpoint in recent years. As pointed out in Jacklin's review (1989), the subjective "task value" was an important variable in the academic achievement plans and of sex differences in academic choices. She asserted that there was little support for learned helplessness models of sex differences in academic achievement behaviour. Learned helplessness has often been studied in subject areas that are sex typed for maleness, thus it may depend on the domain. Girls may exhibit more learned helplessness in stereotypically male fields, while boys may show the same for stereotypically female fields. As asserted by Jacklin, this is not to imply that each gender should stick to its own traditional roles, only that girls may be experiencing reinforcement to feel confidence in their "sex-appropriate roles."

A great deal of research attempts to diffuse the impact of possible gender differences in achievement expectation and confidence, by providing evidence for socialisation of these constructs, thus establishing the causal direction for later gender differences in communication style. Some research which does not take an integrative approach to possible intrinsic differences and social factors often falls short of their mark. Fagot, Hagen, Leinbach and Kronsberg (1985), in a study of playgroup children, coded the

behaviours of 34 children as assertive acts or communicative attempts and made careful observations to assess the teachers' response according to the sex of the child. At ages 13 - 14 months they observed no significant differences in the style of speech acts. However, teachers attended to girls' assertive acts less frequently than boys. And conversely, they attended to girls' less intense communicative attempts, and boys' more intense communicative attempts. These are indeed examples of socialisation pressures. However, the researchers state that eleven months later, the children did show qualitative differences in their style of communication, clearly implying (perhaps not intentionally) that this was a direct result of the teachers' behaviour. This of course does not necessarily follow, since one cannot account for other, possibly innate, factors. Indeed, this is one pervasive problem in the argument for the primacy of social learning in developing language styles and gender roles. Although the role of social reinforcement and modelling, as powerful influences on gender roles, are rarely disputed, it is still difficult to argue that all *important* sex differences must be an artefacts of socialisation. Gender-role socialisation theorists in the past have commonly attempted to provide a comprehensive synthesis where various factors converge to shape girls' and boys' social identity. They argue that these factors include language itself, where "appropriate" roles are transmitted to children through "sexist" pronoun use and gender-linked professional descriptions (e.g. chairman, fireman, salesman, etc.) (Hyde, 1984). An exhaustive theoretical account of language use which may be both instrumental and symptomatic in social constructions of status and power is provided by Mills (1995) and Coates (1987). Though occasionally problematic, the strength of many aspects of social learning theory makes the question of stylistic differences in communication (particularly in problem-solving contexts) particularly salient. Of particular interest therefore in this research are possible communication gender differences and their interpretation by adults, which may in turn come to affect children's own expectations of achievement. This question of possible interpretive bias will be explored in Study 3 (Chapter 8).

2.6 Gender, language development and interactional style

A difficult issue to address for social learning theory is the pervasive finding that girls develop language skills earlier and more rapidly than boys, and later go on to use more grammatically correct and polite forms. As will be described below, it is very difficult to differentiate where linguistic ability merges with linguistic style. This is because "correctness" (relating to enunciation, diction, and grammar skills, etc.) is so

commonly equated with all the trappings of politeness. Polite speech styles often entail aspects of conversation management: deference and turn-taking, self-disclosure, eye-contact, conflict avoidance, indeed all the cooperative and affiliative features associated with stereotypical femininity.

2.6.1 Early gender differences in language acquisition and use

Coates' (1987) review of gender and language research provides indications of sex "appropriate" speech among girls as early as two and three years of age. From infancy girls will be more linguistically advanced in acquisition of words or morphemes and longer word use (Nelson, 1973). Later, preschool girls will use fewer double negatives, and use more standard English than their male counterparts (Trudgill, 1983). They begin to exhibit a higher number of appropriate responses within the areas of greetings, labelling, revisions, and requesting (Klecan-Aker, 1986.) Though this appears to be a consistent finding, it leads to a conventional wisdom that says girls are more fluent in language use, and therefore are more attuned to social evaluations, rather than achievement ones. This, however, does not go without counter evidence. Examining variations in exposure as well as learning capacity, Huttenlocher, Haight, Bryk and Seltzer, et al. (1991) found that the growth of vocabulary in children was correlated over time with the vocabulary of the caregiver (usually the mother), thus countering slightly the explanations of innately greater verbal ability of females.

Much of the early work concerning gender differences in language focused on either the apparent greater ability of females to use correct grammar and polite linguistic forms, or their choice to do so. An extensive review is provided by Cameron and Coates (eds, 1989) who discuss the competing theories for the virtually universal observation of women's use of higher "prestige" language (grammatically correct/polite forms). These theories include, for example, the explanation that women typically use *older* forms of speech because they are more conservative and more modest than men. Others point to status, or at least status markers, as an aspiration held more by women (particularly middle-and lower-middle class) than their male counterparts. This is proposed by Trudgill (1983) who explains that this is the case because being socialised to behave in a "lady-like" fashion is culturally universal, and crosses all class boundaries. Often the typical female use of polite, grammatically correct standard English, is assumed to have some connection with their earlier and more rapid linguistic development in such areas as mean length of utterance (MLU), first

word and achievement of 50-word vocabulary, as discussed by Tanz (1987).

2.6.2 Development of communicative style

There is other evidence that girls' use of standard English is not just a function of aptitudes. Among English Creole speakers, boys often mimic the "feminine" language by using the standard English they learn. Thus the males (as observed in several different nationalities) can use standard English but find "covert prestige" in using non-standard (Trudgill, 1972, 1983). This might suggest that the reason girls will use proper grammar is not simply because they are able. This has also been observed by Labov (1972) who has studied covert-prestige that exists in vernacular forms of English in various urban areas, such as New York. Haas (1979) reviewed evidence that girls' use of sex-appropriate language will contribute to sex stereotypes. Boys will more frequently use expletives and speak in more "instrumental" ways (i.e. factual or technical). Girls demonstrate a more polite form of language use, which might be termed "deferential language." According to Haas, girls' propensity to use deferential language implicates attitudes of submissiveness. There may be an important connection between use of "submissive" language and the reinforcement girls receive for acquiescent behaviour that was reported by Gold, Crombie and Noble (1987).

In addition, girls will more often use "negative politeness" which are linguistic constructions which put the speaker in a subordinated or deferential role with the listener, such as apologetic introductions to statements or questions; for example: "I'm sorry but will you..." or qualified statements such as "No, *I think* it is an oak." These verbal devices received perhaps the most comprehensive attention in the work of Lakoff (1975) who first described these as "hedges." A "tag question" was a term she used to characterise a similar use of verbal equivocation, the use of short confirmation-seeking questions attached to the end of a declarative sentence, e.g. "It's the number 57 bus, isn't it?" Lakoff's work, which provided a comprehensive taxonomy of speech style devices, established one central area within the study of male and female interactional style.

In a study of assimilative and accommodative discourse in preschoolers, by Austin, Salehi and Leffler (1987) it was revealed that boys used more "accommodative devices," defined as initiators, attention-getting devices, whilst girls' discourse included more "assimilative devices," defined as facilitators and reinforcers. The

argument that males and females hold different communicative motives, is an issue that has received considerable attention. Coates (1987) cites research (e.g. Brown and Levinson, 1978) that has examined the tendency that girls from an early age will learn to address people in a way which places themselves in a weaker position of deference, with a view to making the addressee comfortable enough to make an open response. Coates argues that to weaken one's own position is not intrinsically a subordinate approach, but among girls is possibly a mechanism with which to foster cooperative communication. However, she points out that this places them at a disadvantage in mixed settings. This effect has been of particular interest for educators interested in the efficacy of mixed-gender learning pairs. In the realm of computer tasks, the suggestion that mixed-gender pairs is disadvantageous was supported, where same-sex pairs outperformed mixed pairs on a computer-based problem-solving task (Fitzpatrick and Hardman, 1994). However, Esposito, (1979) observed that mixed-gender pairings tended to decrease the sex-typed interactions in children, where boys and girls begin to adopt each other's style of interaction, with the notable exception of interruptions--boys tended to interrupt their conversational partner twice as often as girls when in mixed-gender settings. Other researchers (e.g. Spender, 1980) have voiced generalised concern with classroom gender dynamics, particularly male communicative dominance, which includes more interrupting and greater verbosity. That girls are typically more hesitant, tentative, tactful etc. in the same setting, only compounds the disadvantage (Coates 1989). This pattern is also observed in adult settings particularly in terms of "control of the floor" in speaking turns (Woods, 1989).

2.6.3 Self-presentational style

One important area of male and female speech styles which has received a great deal of attention is the possible differences in self-presentation. If considered on the level of *the impression one can present with the words one uses* (intentional or not), then this term can refer to virtually any utterance. In spite of the breadth of this area, several people have provided useful syntheses of male and female differences. Goodwin (1993) for example discusses male and female social identity through conflict, whereby for girls, relative rank in disputes is less an issue than inclusion in friendship networks. Thus their "presentation of self" (i.e. how they talk about themselves) is always framed as their place within (or exclusion from) a social circle (Denmark, 1995). In discussion of more specific speech patterns, researchers such as Tannen

(1990) and Gilligan (1982, 1993), who both cite many further research examples, describe female speech where a recurring theme is verbal presentation of one's social presence in a way that is as non-threatening and as non-hierarchical as possible. Elements also central to self-presentation are the specific words used, and the grammatical structure as studied by Lakoff (1975, 1977). Hedges and tag questions are seen as means of expressing opinions within a social framework which avoids conflict and preserves face, both for the speaker and the interlocutor (either of whom may be incorrect in a declarative utterance about something). Tannen (1990) calls this "rapport talk": that in which the speaker, through deferential, tactful and negotiative speech forms, minimises conflict potential.

What may be of interest, developmentally, is the degree to which this behaviour is under conscious control, whether it occurs spontaneously or through modelling and imitation. Speaking generally of public "Self-Presentation" Habermas (1984) writes that:

"the actor evokes in this public a certain image, and impression of himself, by more or less purposefully disclosing his subjectivity. Each agent can monitor public access to the system of his own intentions, thoughts, attitudes, desires, feelings, and the like, to which only he has privileged access. . . . Thus the central concept of presentation of self does not signify spontaneous expressive behaviour but stylising the expression of one's own experience with view to the audience" (p. 86).

This characterisation seems to apply to *adult* levels of social awareness and seems to suggest a clear intentionality in the way people express things which reflect on themselves (whether good or bad). This "dramaturgical" treatment of communication (as Wertsch characterises it), on the surface seems to contrast with widely held concepts of gender and "interactional style," as innate language modes, that are not intentionally adopted by males and females. However, while the outward "style" may be conscious to the degree posed by Habermas and Goffman (1959), the underlying motivation attributed to females: to be non-threatening, cooperative and affiliative may be not be.

Related to "self-presentation" is the concept of "voice." Wertsch, in *Voices of the Mind* addresses the recent history of this term and how he and others have used it. Great attention is paid to both Vygotsky and Bakhtin as two early "voice" theorists. Bakhtin was a contemporary of Vygotsky and they had academic interests that were

very much in parallel. Wertsch writes, "For Bakhtin, voice involved the much more general phenomenon of 'the speaking personality, the speaking consciousness'" p12. This in fact is the very same way Carol Gilligan was to later use the term in her book *In a Different Voice*. The problem of "context" can be explicated from the theoretical account of "voice" as proposed by both Bakhtin (as cited by Wertsch) and of Carol Gilligan. Her well known criticism of Kohlberg's moral development theory is on the grounds of what Wertsch calls "univocal" presumptions. In Kohlberg's famous moral dilemma test question of whether a husband (Heinz) should steal an unaffordable drug to save his wife's life, a girl received a lower moral reasoning score because her response did not follow the (male) researcher's concept of what was being asked of the children. The girl's answer according to Gilligan did not occur within the researcher's framework of moral stages, and thus was assessed as less sure. She argues that there was a failure to appreciate the "multi-voicedness" approach of the girl. "Amy is answering a different question from the one the interviewer thought had been posed. Amy is considering not *whether* Heinz should act in this situation ("Should Heinz steal the drug?") but rather *how* Heinz should act in response to this awareness of his wife's needs (Should Heinz *steal* the drug)" (p.31). This criticism is given considerable attention in Wertsch's discussion of the importance of acknowledging the multi-voicedness of everyday questions, interpretations and thus answers. The primacy of the "voice"-context is stressed by Bakhtin (as cited by Wertsch, 1991) who writes that: "speech can exist in reality only in the form of concrete utterances of individual speaking people, speech subjects. Speech is always cast in the form of an utterance belonging to a particular speaking subject, and outside this form it cannot exist". (p.50) This has general relevance to the issue of "multi-voicedness" which may exist between children and adults in problem-solving settings, where the child's communication may spring from an interpretation of the context, which is not in synch with that of the adult, thus creating a difficulty in the negotiation of meaning.

Though most speech style research has focused upon adult communication (e.g. Tannen, 1990); Sheldon's (1990) "Pickle Fights" study has now appeared in several papers and books (e.g. Tannen, 1993) as part of the discussion of female interactional style, and social perspectives. It recounts a study of naturalistic observation among preschool children which revealed striking differences in the male and female discourse. In sequences of "wendy-house" fantasy play, involving disputes over a plastic toy pickle, girls effectively interwove their personal dispute over a desirable

toy into the fantasy dialogue (of a domestic nature), thus extending the intact story-line over a longer period of time than the boys. The very same dispute occurred among the boys. However, it disrupted the fantasy play, and caused more abrupt ends to a line of play dialogue. Sheldon, however, at no point tries to create links between these robust stylistic differences and achievement orientation. "Achievement" in this case was the control of access to a toy plastic pickle; and she is clear in stressing that the girls were no less driven. There is other research which reminds us not to presume that affiliative interactional style can be equated with greater generalised social harmony. Pellegini (1984) found no difference between male and female utterances of assertives, regulatives and expressives, which are speech classifications traditionally relating to masculinity. Moreover, Piel (1990) found among 2nd and 3rd graders (approx. ages 6-7) that sex (female) was the best predictor of verbally aggressive expression, and postulated a connection between verbal aggression and maturity. This would imply that underlying levels of aggression are not that different for girls and boys, but how aggression is expressed is. Therefore the usual absence of physical conflict among girls may distract the observer from both their inclination and ability to use language in an aggressive way.

2.7 Problems with traditional models of "masculine" and "feminine" speech development

It is not clear that a "sociability" drive, widely attributed to females, and their apparent greater linguistic ability are two sides of the same coin. Harris (1977) provides one of the largest reviews of research supporting gender differences in verbal ability which spans the areas of MLU, first recognisable speech, vocabulary milestones, syntactic development, as well as areas of speech pathology showing greater male affliction. However, as pointed out by Tanz, (1987), "... there has been little conceptual unity in this work, partly because until the 1960's no attempt was made to develop an overall theoretical perspective about what children learn when they learn language." (p.163) It appears that the *female linguistic advantage thesis* suffers the same problems as its male spatial/maths counterpart: the "innate or socialised" conundrum, generally small effect sizes etc. She cites Klann-Delius' (1981) review in particular, which identifies replication failures and very small effect sizes.

Macaulay (1978), whose article is titled "The myth of female superiority in language" clearly does not agree with the conventional wisdom of the day. His critique of

research linking superior female language ability and stereotyped sex-roles is nothing less than scathing. His argument implies that findings such as Moore's (1967) are so unreliable, and so often non-significant, that the inferences are at best simple-minded and at worst divisive. However, as mentioned earlier, this work was done during an era when critics of traditional sex-roles could be counted on to oppose virtually any theories of innate sex-difference. Macaulay in his paper also criticises Garai and Scheinfeld (1968) for indulging in overt stereotyping. His quotation of Garai and Scheinfeld reads:

"The earlier speech development and greater verbal fluency of girls appear to be related to the earlier maturation of their speech organs, their innate [!] tendency toward more sedentary pursuits, their closer contact with mothers, and their greater interest in people, and the encouragement of *social responsiveness and compliance* . . ." (p. 359, his "!" mark, my emphasis).

Macaulay's objection is to the stereotyping of gender roles. However, what may, in the long run, prove to be as problematic, is the way "*social responsiveness*" and "*compliance*" are assumed to be virtually synonymous or at least integrally linked. Macaulay, and indeed most others, do not generally make any clear distinction between these two constructs. Similarly as cited in Section 2.3.2 Gold, Crombie, Noble and Mate's (1984) observation that girls tend to follow an incorrect adult model instead of pursuing the correct task procedure is commonly interpreted in a way which consolidates "social motivation" and "compliance." Until more recently, psychologists, perhaps in deference to the more "progressive" social learning theory of the day, seem to have consolidated these and other constructs within "femininity," earnestly presenting them as social artefacts and thus could not concede the possible innateness of one of these behaviours, and not the other. However, social fluency, for example, has not experimentally been shown to be connected with motivation for success (Lenney 1977); nor has cooperativeness precluded achievement (Jacklin, 1989; Maccoby, 1990).

Thus it seems there are three distinct issues which seem to run in parallel with each other, yet often tangle and create confusion and apparent contradiction. One is the argument about the supposed innateness of cognitive aptitudes (spatial/linguistic ability); another is the debate about fundamental motivations (mastery vs. affiliation) and a third, to use a very broad generalisation, relates to how males and females express themselves: self-presentation, interactional style etc. They seem to become tangled because innate differences in pure cognitive performance as tested through a

psychometric approach have traditionally been fiercely disputed by social learning theorists. However, many of the findings about interactional style (presented by researchers generally opposed to innate differences, e.g. Tannen, 1979, Ervin-Tripp 1977; Sheldon, 1990; Coates, 1987, 1989 etc.) are described through children's use of language. Additionally, the theories regarding "female" interactional style almost always rest on verbal expression: subtlety, negotiation, social sophistication, which often described as operating out of a basic cooperative and affiliative mode. On the one hand, this *seems* to concede motivation differences, and on the other, returns one to innate cognitive differences (linguistic) and *seems* to leave one with a contradiction.

The impasse which existed in the debate of causal factors in both cognitive gender differences (spatial/verbal) and apparent achievement expectation, may have in part stemmed from a failure to explore how the style of self-expression (which could be genetically influenced) and social learning interact. The expression of *ostensibly* lower expectations, dependent-behaviour, and help-seeking among females may be spuriously linked by both lay persons and researchers alike, to their use of more genteel and sophisticated language. This may be because as behaviours they are difficult to distinguish from each other. It is at this juncture that interactions between language and cognition are addressed. Contradiction and confusion between various constructs may persist if firstly, social motivation (perhaps innately greater in females and expressed through language) is equated with linguistic aptitudes; and secondly, that both of these shape (or even constrain) any underlying achievement motivation (task-mastery, competitiveness etc.). Many recent researchers (including many social learning theorists) have not held these presumptions, and thus have quite successfully talked about gender differences in communicative style, without relegating (in theory) all females to the traditional social roles that tend to follow from the non-competitive, non-goal-oriented model of female behaviour.

Psychologists such as Wertsch (1991), Haas (1984), Lenney (1977) and Maccoby (1990), have made observations which identify knowledge growth, learning and the achievement milestones these entail, as more (or less) socially mediated events. This is perhaps why the work of Vygotsky has become so popular in the last dozen years. Having arrived in the western world on the heels of widespread critical assessment of Piagetian assumptions, his theory of cognitive development moved away from static assessment, and incorporated dynamic social interaction. Wertsch (1991) provides a succinct summary of Vygotsky's essential themes: "1. a reliance on genetic, or

developmental, analysis; 2) the claim that higher mental functioning in the individual derives from social life; and 3) the claim that human action, on both the social and individual planes, is mediated by tools and signs. These themes are closely intertwined in Vygotsky's work, and much of their power derives from the ways in which they presuppose one another. It is thus somewhat artificial to isolate them. . . ." (p.19) Carol Gilligan (1992), perhaps one of the more outspoken theorists on language, identity and social motivational differences, makes this very point. Considering the "nature/nurture" question, she remarks "I find the question of whether gender differences are biologically determined or socially constructed to be deeply disturbing. This way of posing the question implies that people, women and men alike, are either genetically determined or a product of socialisation--that there is no voice--and without voice, there is no possibility for resistance, for creativity, or for a change whose well springs are psychological." (p.xix). She refers both to reversing gender inequity, and the belief that voice (meaning both "perspective" and "talk") can be the medium (culture) and substance (constitution) of gender roles.

This may be why (as discussed in Chapter 1) the nature/nurture argument, where still polemically argued, represents a mistaken belief that natural forces (genetic) can *even theoretically* be isolated from social forces. Indeed Vygotsky points out (as cited by Wertsch, (p.22) that: "The cultural development of the child is characterised by the fact that it transpires under conditions of dynamic organic changes. Cultural development is superimposed on the processes of growth, maturation, and the organic development of the child. It forms a single whole with these processes. It is only through *abstraction* that we can separate one set of processes from others" (p.47).

This and recent research has made clear that we must critically assess the traditional connection between some psychological constructs, measurable in specific (often laboratory based) contexts, and their presumed social sequelae. The most glaring example, to which most attention will be paid, is this concept of achievement motivation and its traditional link with masculine roles. This is the tenuous but widely held connection between interactional style and the familiar task-related concepts of "competitiveness," "mastery motivation," "task-focus" and "goal directedness," etc. For most people, including many psychologists, these constructs are equated with masculinity. They are used to define both the male style of interaction and an underlying motivational state. However, this may simply be a function of the fact that most cultures are male dominated. The belief is that the

"style" and "disposition" of whoever is dominant will logically be the prerequisite for that successful status. As recent research may show, connection may prove to be a rather monumental example of an illusory correlation.

A related issue in the area of language development is the difficulty in making a distinction between language proficiency and language style. Tanz, in an introductory chapter for *Language, Gender and Sex in Comparative Perspective*, provides a review of competing positions regarding language ability and also raises this issue of style vs. proficiency. Her point is that researchers, without consciously doing so, make gender comparisons within a framework of *either* ability *or* style. Tanz points out that 1970's research in particular was preoccupied with ability differences using a "psychometric" approach. She refers to MLU research (Schachter, Shore, Hodapp, Chalfin and Bundy, 1978), first appearance of two-word utterances (Ramer, 1976) and first achievement of a 50 word vocabulary (Nelson, 1973). She points out that in contrast, the 1980's saw an increase in *stylistic* differences research.

2.8 "Style" and "ability" in language development

The recurring question of course is why do girls develop more socially affiliative and fluent language? And, for that matter, what is the exact process that seems to place them at a disadvantage soon after beginning their formal schooling? If the stereotype that girls are more deferential, dependent and affiliatively oriented is a real and persistent one, and it seems it is, then how can aptitudes be re-evaluated, in a social sense, to allow positive growth among girls and boys?

In a general sense, it would seem important to evaluate carefully the relationship a child's language has with learning and with ability. Discussing the work of Kessen (1979), Bronfenbrenner (1979) and Gelman (1978), Belmont (1989) says "Together these works make a broad case for viewing children's thinking as goal-directed strategic activity that, although ultimately internalised, must nevertheless develop and operate within an influential and responsive social context." (p. 147) In terms of goal-directedness, there are links with Piaget, whose research elucidated how the child attempts to "construct" a representation of their environment; and in terms of the social-interactional nature of the learning setting there are important parallels with Vygotsky's Zone of Proximal Development, in which the adult and child must be mutually aware of a goal and use language to negotiate further progress.

This model of reciprocity in the learning/language setting, if accepted, makes the theorised processes of gender-role socialisation especially powerful. According to Belmont (1989), in order to understand the internal thinking and feelings of the young child (preschool) one must look at overt speech, because speech in the young child is often synonymous with internal activity, whereas in older children, spontaneous activity happens internally. In other words, among preschool children, thinking will often be "out loud." If this could be proven, and if it can be shown that language skills develop sooner in females, then one might hypothesise an observer effect, when viewing preschool girls engaged in problem solving tasks. A bias could occur when teachers/parents view girls apparently engaging in earlier "dialogue" (e.g. "Where does this go?") when in fact they could be simply witnessing a natural phenomenon of overt thinking. If this kind of misunderstanding occurred persistently one can imagine a biased expectation of ability which could eventually colour the child's own beliefs and expectations.

Most of the research which has explored gender differences in interactional and linguistic style, such as Tannen (1991), Schiffrin (1993) and Lakoff (1975) have focused on adults. There has been work of this type with young children, such as the study conducted by Sheldon (1990) and others. However, such studies normally examine the communicative style of children who are already very proficient speakers. However, as mentioned earlier (Section 2.5) there is no clear way to positively tell when the *ability* to use indirect and more polite forms, as studied by Bates (1976) and Ervin-Tripp (1977), becomes an aspect of *stylistic* gender differences. Studies mentioned by Tanz (1987) illustrate this problem. Referring to a role-playing experiment (Bock and Hornsby, 1981) studying use of polite forms of requests, they report that girls were "shown to deploy politeness devices more often" but that "boys match them in their passive knowledge of politeness rules." (p. 169) This has a parallel in the work described by Trudgill (1983) regarding boys' intentional use of less polite and non-standard English. Leaper (1991) examined peer discourse between boys and girls, where primary modes of communication included *collaborative*, *controlling*, *obliging* and *withdrawing* (distancing and non-direct). According to Leaper, similarities were more conspicuous than differences, and collaborative and cooperative acts were the most common style of interaction for both boys and girls. Thus a problem, which often goes unacknowledged, is knowing when an observed gender difference among young children (2 years old in the case of Bates' study) is a

reflection of aptitudes and maturity, or of an adopted style of interaction. According to Wertsch, ". . . it is meaningless to assert that individuals 'have' a sign, or have mastered it, without addressing the ways in which they do or do not use it to mediate their own actions or those of others." (p.29)

The problem of drawing lines between "style" and "ability" is a central issue which is bound up with the problem of making attributions about *social* vs. *achievement* motivation in children, particularly in a challenging problem-solving setting. Although Tanz (1987) places the "style vs. ability" problem *within* the study of language development, it also (as alluded to earlier) exists *between* language development and problem-solving ability. That is to say if a child is capable of making an utterance which employs their knowledge of pragmatic communicative skills, and if some of those skills include the use of deferential/polite, indirect or self-deprecating utterances (for socially facilitating reasons: as females in particular have been shown to do), then there is an inherent possibility that an adult's interpretation of these utterances will form part of their judgement of the child's *task-ability*, rather than their communicative fluency. This, in turn, raises the issue of mutual understanding of context, which will be addressed more specifically in the next section of this chapter. In order to assess the potential for mis-attribution within adult-child interaction, it is important to explore what is known and presumed in regard to children's pragmatic language abilities.

2.9 Developmental pragmatics, speech act theory, and the meaning of children's utterances

Speech act theory was briefly defined in Chapter 1 as a discipline within linguistics, whose foundation is generally credited to the work of Austin (1962, 1971) and Searle (1969, 1971) who are most well known for their philosophical approach to language. Mey (1993) aptly describes the area of early pragmatics research (e.g. George Lakoff and John Ross) as an outgrowth of traditional structural linguistics, which splintered away because of a growing unhappiness with the formalistic constraints, which were seen to relegate the study of naturalistic, non-literal, ironic, metaphorical aspects of language (i.e. all things that required rigorous contextual analysis) to the fringe of linguistics. Mey cites a charming analogy made by Geoffrey Leech in which the pragmatic linguists are likened to colonials sailing off to distant lands only to find

them already inhabited by natives--linguistic philosophers such as John Austin and John Searle. The development of pragmatic theory by many later linguists rests heavily on their original philosophical contributions. The main concepts addressed by these philosophers of language relate to the analysis of *meaning* within any given utterance. "Meaning" can in turn be divided into several other conceptual categories. *Illocutionary acts* are defined as acts of communication in which the speaker intends, through language, to create a belief or state of mind in the listener, including the listener's realisation of that intent. Thus the effects of this speech act (belief/state of mind) in the listener) is termed the *illocutioary force* of the utterance. *Perlocutioary acts* are subtly different and are described as utterances which have the effect of both creating a belief in the listener as well as the inclination to respond to the utterance either verbally or through action. All speech, according to Searle (1969), can be divided into units of meaning. These units are what he and others have termed "speech acts," and form the smallest division of language. This is because the speech act theorist's main concern is the transmission of meaningful messages using the "units" that people in everyday interaction use. As put by Searle (1969) (albeit rather convolutedly) "The unit of linguistic communication is not, as has generally been supposed, the symbol, word or sentence, or even the token of the symbol, word or sentence, but rather the production of issuance of the symbol word or sentence in the performance of the speech act. . . the production of issuance of a sentence token under certain conditions is a speech act, and speech acts . . . are the basic or minimal units of linguistic communication." p16. One can immediately see the dramatic differences between this approach to meaning and the more formalistic, structural (syntactic) approaches to analysing meaning, although it is also clear that they are not exactly "competing" theories of language use, but rather have different analytical agendas. A comprehensive historical perspective of pragmatics and speech act research is provided by Mey (1993).

Pragmatics research and Speech Act Theory is of direct relevance to very young children's language, particularly that which may occur in contextually ambiguous problem-solving areas, as described in Chapter 1. Task-oriented settings may be contexts where the every-day interpretation of verbal behaviours might be coloured by the adults' conception of "context" for the child, as well as their presuppositions about what children in general may be capable of linguistically. As will be elaborated further below, traditional concepts of preschool children and younger, include the belief that they are not intellectually capable of comprehending, let alone employing speech

which is extra-linguistic in meaning—non-literal, culturally conventional ("non-natural" as described by Austin, 1962), ironic, or metaphorical.

Perhaps the most fundamental modification to Piaget's conceptualisation of cognitive development has been the reassessment of children's "egocentricity." In overestimating egocentricity, Piaget concluded that pre-operational children were more cognitively constrained than is now thought. This change occurred in part through a critical evaluation of the language used in the classic conservation tasks. (Donaldson, 1978). It was demonstrated that many children defined as pre-operational through Piagetian testing procedures, were in fact capable of operational understanding and perspective taking. Failure on conservation tests occurred because children *did* apparently try to analyse adult questions in a *pragmatic* sense. The classic conservation tests, such as constancy of number were designed to assess children's ability to attend to objective numbers of counters, rather than superficial transformations of their arrangement. However the procedure of asking a child to watch carefully a superficial transformation, then asking if length or numbers were equal, greater or less, may have overestimated the children's ability to understand language in a way that is disembedded from the social context. To the child the questions may have sounded pre-emptive, indeed as many adults might perceive them.

2.10 Children's developing pragmatic ability

Traditionally in linguistics, utterances were classified using an adult model of usage. The construction of propositions (noun and verb combinations) and the uttering of these words create declaratives (e.g. "John hit the ball."). Syntactic manipulation takes place to modulate meaning ("Hit the ball, John" or "Would you hit the ball, John?") The underlying assumption is that to manipulate meaning in this way, one must master first the necessary semantics and then the syntactic rules to create meaningful speech acts. Bates, Camaioni and Volterra (1979), who provide this example, open their chapter with a seemingly naive question: "Why does a child learn to talk?" They assert that most research addresses the structure of early speech and environmental (parental) input to the child's language growth, thus focusing on *how* a child learns to talk, whilst commonly ignoring the obvious question of *why* a child should want to talk. This point is also made by Cazden (1977) who remarks that ". . . the cognitive psychology with which linguistics has been combined has generally been concerned with the *what* of human behaviour and the *how*, not the *why*." (p. 310) They invoke

the work of Austin and Searle and the field of speech act theory to draw attention to communicative motivation in young children. Becker (1990) has a very similar approach. She acknowledges the stress placed upon "socialisation and enculturation" mentioning the contributions of Berko-Gleason (1987), Pellegini, et al. (1984) and others who have used a social learning theory framework. Becker and others (e.g. Halliday, 1975) attempt to integrate social aspects of language learning and innate factors. It is a system, which according to Becker consists of: "(1) innate predispositions that are cognitive, perceptual, and motivational in character; (2) input from caregivers that capitalises on children's predispositions and provides children with rich information about the components of pragmatic rules." (p. 7-8) As Becker points out, pragmatics is one distinctively problematic area of language development because unlike the helpful framework of "rule acquisition" that is part of grammatical development, pragmatic language has no stable rules, it is contextually contingent, infinitely flexible; and thus pragmatic correctness, as Becker puts it, is "in the ear of the listener." (p. 9) Although not invoking innate pragmatic universals¹, as Chomsky does for grammatical universals, Becker does argue that children are born with "general social dispositions and needs that they strive to meet with many types of behaviours, including pragmatic ones." (p. 11) The underlying implication in this research is that the study of how children acquire language should be fundamentally informed by the study of *why* children communicate in the first place.

2.10.1 Pragmatic utterances and unifying theories of innate social behaviour and learning

Bates et al. (1979) suggest that object labels used by children (though often ambiguous) have all the necessary underlying syntactic structures needed for illocutionary force, except the child is not able to produce the syntactic structure needed to make them overt. Thus as put by Bates et al. utterances such as "shoe!" "have an underlying structure something like 'I indicate to you a shoe' or possibly 'I command you to give me the shoe.'" (p.113) Indeed, developmental linguists for the past two decades have formally examined the onset and complexity of children's holophrases as they occur in the first 18 months. However, it is still debated whether

¹ Becker cites the work of Gumperz (1987) who does suggest "politeness universals", relating to social behaviour. In a related way, Bruner (1983) discusses his idea of the Language Acquisition Support System, a conceptual corollary to Chomsky LAD. Such a system is directly connected to "intersubjectivity" since it depends on parent-child mutual understanding and synchronicity.

the interpretive leap of "reading-in" syntactic structure into single word utterances is a tenable one. This area appears to be another example of language theory where the reality of development lies somewhere in between competing hypotheses. Ochs, Schieffelin and Platt (1979) state that "Children in the initial stages of language development rely much more heavily on the utterance context in conveying their wants, needs, beliefs than do adults. They point out that a child often deletes a contextually highly predictable piece of information from an utterance. The addressee (if there is one) makes sense out of the utterance by relating the utterance to obvious features of the context." (p.114) Few linguists would dispute this, yet to categorically state that grammatical structure is present in the vocalisations of pre-verbal toddlers may be an inference that is reaching too far.

In *Speech Acts*, Searle, who it can be argued helped inspire developmental pragmatics, states that "the characteristic grammatical form of the illocutionary act is the complete sentence (it can be a one-word sentence) . . . sentences, not words, are used to say things." (p. 25) Speech act theory is important to the study of language development because of its assumption about the primacy of social motivation, and it thus helps bridge the gulf between behaviourist reinforcement/social learning and innate language mechanisms of Chomsky. Bruner (1983) describes these two polar opposites as being impossible and miraculous, respectively. Developmental pragmatics and speech act theory helped launch a new promising integrative movement. As expressed by Garvey (1977) "One construct of linguistic pragmatics, the speech act, has proved particularly attractive to students of language development possibly because that construct promises to relate the functional and the formal aspects of language." (p. 63)

Bates, Camaioni and Volterra (1979) cite other studies which describe many young children's utterances as carrying this kind of hidden structure and make the bold statement (for the time) that: "although the proper grammatical marking of communicative intentions may be delayed. . . performative intentions (or locutions) can be inferred as far back in language development as anyone's record go." (p. 113) They point out that their results indicate an approximate age of 10 months for the onset of such utterances, which corresponds to a particular aspect of Piaget's sensorimotor stage of development. This comparison with Piaget (which they make) seems ambiguous, but the implication of the comparison may be that at the sensorimotor stage, a linguistically egocentric child should be unable to conceptualise a shared understanding of context, thus precluding such utterances as illocutionary acts.

Support for pre-verbal linguistic "structure" was also provided by Halliday (1975) who discusses infants' pre-verbal ability to communicate referentially, with a system which "has a semiology and a phonology but not yet a lexology." (p. 38) This attention to the ultimately social function of language and speech acts is reflected in the title of his book, *Learning How to Mean*. It is of interest to note that although speech act theory is highly relevant to the overall theory of pragmatic development, Searle may not have explicitly believed in pre-verbal speech acts. In his discussion of rules (linguistic and otherwise) he points out that there are two types: regulative, e.g. "No talking with your mouth full," and constitutive rules, e.g. "crossing the finish line first constitutes a win." Searle uses a football metaphor which perhaps reflected his opinions about language development. He asserts that "The activity of playing football is constituted by acting in accordance with these rules; football has no existence apart from these rules." (p. 41) He later states that "the semantics of a language can be regarded as a series of systems of constitutive rules and that illocutionary acts are acts performed in accordance with these sets of constitutive rules." (p. 42) This would imply that if you cannot play by the rules of language, you cannot by definition speak, or at least not very well.

Developmental pragmatics has however, during the last couple of decades, undermined this viewpoint, by progressively uncovering more and more facets of children's pragmatic abilities, at earlier and earlier ages. The research serves to demonstrate both the difficulty in corraling language as rule governed behaviour, and the tenuousness of beliefs about the order in which linguistic milestones are achieved. Garvey (1977), for example, in a study of children's questions, provides evidence from a corpus of data that children, prior to mastering many grammatical and syntactic rules, display pragmatic skills, particularly the understanding of listeners' contingent questions (requests for clarification, repetition of declaratives) and the production of appropriate information to maintain conversational flow, rapport etc.

Becker (1990) and others assert that the motivations to produce language pragmatically is innate, but the form in which this manifests itself is a function of a child's interaction with caregivers. She cites Diaz (1986) who suggests that "there is a structural similarity between children's private speech and mothers' verbal teaching behaviour. . ." (p. 465) The implication is that although on one level teaching is a utilitarian parental function, for the child it is also social contact and thus any verbal interaction, in spite of being task-oriented or instructional, will, for the child, be social.

Thus it would not be implausible that this type of verbal behaviour were imitated by the child in other task-oriented encounters. There is not much research available which confirms this however. There are, though, examples where children's very early use of language is demonstrably pragmatic, and is non-literal (and in fact non-sensical if taken literally). This is illustrated in a rather amusing example described by Ferrier (1987) where a 12 month-old infant would greet her mother by saying "Phew." This is what she had heard on several occasions when her mother had entered her room and realised her nappy needed changing. The infant had evidently interpreted this as a customary greeting when someone entered a room. Linguistically it is clearly imitative. Pragmatically, it appears to demonstrate a very early desire to accommodate to social norms, since it only occurred when a greeting would be expected--upon appearance of a person, not their departure, and not mid-way through a visit. While this example suggests an innate sensitivity to, or at least extremely early acquisition, of social norms, other observational studies indicate that aspects of pragmatic language development manifest themselves within the correct *form* of utterances rather than correct *context*. Becker (1990) provides a brief review of findings for children's use of polite expressions. Often early expressions of "thank-you," "please" "hello" and "good-bye" begin to appear as early as 15 month but often appear indiscriminately during either giving or receiving, and arriving or departing respectively. Snow (1981) and Snow, Perlmann, Berko-Gleason and Hooshyar (1990) describe in detail how politeness rules are provided by parental example, prompting and direct instruction. However, almost all researchers now stress the active, and possibly innate, drive of infants and young children to seek-out these rules and norms of usage. Other research has provided observational evidence for this such as the study by Martinez (1987). He observed active attempts of 2 and 4 year-olds to use verbal and non-verbal strategies for conversational flow, such as "turn-about" (devices requiring a response, e.g. "what?," "what did you say?") which had been experienced previously through mother regulated interaction.

2.10.2 Theories of children's private speech and further issues with pragmatic development

Returning to the issue of children's "private speech" mentioned in connection with Becker's (1990) work, this is an area which has received some attention from both cognitive development and pragmatics research. This kind of speech can be described as that which is uttered by an individual without the need for any reception or

response from another; indeed, it is speech which does not require the presence of anyone else but the speaker. It is commonly termed "talking to oneself" or "thinking out loud." Piaget (1926) characterised private speech as "egocentric speech" because all outward signs indicated that it was "a by-product of the child's activity, as a stigma of the child's cognitive egocentrism" (Vygotsky, (p. 28, 1986). Vygotsky provides a very different explanation for this phenomenon of talking to oneself. Rather than being asocial babble which vanishes as a function of cognitive development, it is self-regulatory speech which serves a very important function in problem-solving. His observational studies indicated that this type of speech increases in the presence of challenging, but not insurmountable obstacles:

We found that in these difficult situations the coefficient of egocentric speech almost doubled, in comparison with Piaget's normal figure for the same age and also in comparison with our figure for children not facing these problems. The child would try to grasp and to remedy the situation in talking to himself: 'Where's the pencil? I need a blue pencil. Never mind, I'll draw with the red one . . .'

In the same activities without impediments, our coefficient of egocentric talk was even slightly lower than Piaget's (p. 30)

Becker (1988) proposes that it is talk which serves to internalise pragmatic rules that are modelled by parents over time, and thus is a form of rehearsal. Often it is considered a developmental step in the process of vocalised "social thinking" becoming internalised and thus in time "goes underground" (Manning, 1994; Fernyhough and Russell, 1995). Its traditional relationship with linguistic growth, which in turn sees earlier female development, would suggest that there will be gender differences in either the timing or duration of private speech. However, research which has examined this specifically, has reported no-difference findings (Kohlberg, Yaeger and Hjertholm, 1968).

There is now a wealth of research which has examined children's and infants' pragmatic language abilities. The recurring theme in most of this research is of earlier-than-expected proficiency. These abilities have been explored across nearly every domain of pragmatic speech. Besides the work cited above, examples include the understanding and performance of commissives (Searle, 1969) i.e. speech acts which commit the speaker to certain actions by virtue of the illocutionary force of an utterance, as in the case of promising. Astington (1990) discusses a study which demonstrated understanding of commissive (promising) speech acts when compared

with similar utterances, such as threats, and with simple declaratives. Other developmental pragmatics research has provided evidence for children's early normative use of polite utterances (Ervin-Tripp, 1979) and their ability to understand conventional discourse markers and turn-taking (Becker, 1988). Sanders and Freeman (1995) describe what they have called "neo-rhetorical" behaviours in 5 and 6 year olds in a conversation analysis study. They define this term as the emerging ability (which matures in early adulthood) to assess the social impact of each interlocuter's turn at having the floor, and making verbal tactical moves to steer conversation in a desired direction. They remark, "These children often detected and responded to the potential at each turn for the interaction to take an unwanted course, at a level of intricacy and subtlety that has surprised us, producing turns at speaking and related behaviours proactively, systematically, even creatively. . ." (p. 2) In general their argument is that even among 4 year olds, one can observe in certain contexts, surprisingly advanced abilities to employ verbal tactics, such well timed rhetorical questions, which help shape an interaction in a pre-planned way. Their point is that children's conversations, rather than being a system of simple action/response combinations, show an ability to actively anticipate and shape a social interaction in often personally expedient ways, particularly in regard to relative power among playmates. This brief overview illustrates the fact that pragmatic ability resides in different levels of language, some purely structural (i.e. grammatically correct usage for certain effects) and some on more social interactive levels. This latter type refers to children's language use which reflects conversational, interpersonal competence; and it is this which is of most interest for this research.

2.11 Children's questions and requests

As discussed in the previous section, critiques of Piaget's analysis of preschool children's cognitive abilities, have focused on the fact that he may have fundamentally underestimated their social awareness. Test questions and propositions must be expressed through language, and as argued successfully by pragmatics theorists, meaning will, at the very least, be coloured by the context of any utterance. The criticism of Piaget's assessment of children's egocentricity is relevant to the contextualised meaning of children's questions insofar as an underestimation of social sensitivity may also lead to an underestimation of linguistic skills.

In reference to the function of young children's questions, Piaget (1926) wrote: "What



are the intellectual interests. . . what are the *logical functions* to which the questions of a given child testify, and how are those interests to be classified?" p. 162. In an earlier passage he proposes that: "The child talks either for himself or for the pleasure of associating anyone who happens to be there with the activity of the moment. . . he feels no desire to influence his hearer nor to tell him anything." (p. 9) Later in the initial discussion about "why" questions he addresses what he calls "childish" questions whose function may either be "finalistic" or causal and logical. By this he refers to the myriad questions children produce which ask for causal explanations for physical states and events in the world (e.g. "Why is the sky blue?", "Where does the moon go during the day?"). His comments regarding these, however, provide some opening for further possibilities in children's intellectual and communicative intentions. "It is therefore, not possible to see at first which of these two shades of meaning ["finalistic" or causal and logical] is uppermost in the child's mind. There may even be a quantity of other meanings which allude our understanding." (p. 165) Later researchers, such as Sinclair and Van Gessel (1990) and Snow et al. (1990), have proposed social facilitation as one "meaning." However, at preschool ages Piaget's characterisation of the pre-operational child is of egocentricity, a phase of development where concern for the social inclusion of "other" is not possible. Piaget's answer to his own question quoted at the beginning of this paragraph, follows in his later pages, and includes many further explanations for children's questions, but most concern the child's developing epistemological sense, and not the possibility of pragmatic, and non-literal social facilitation. He discusses children's egocentrism and anthropomorphism and their preoccupation with agency. However, the topic of pragmatics is only alluded to when he mentions children's growing understanding and desire to master rules of language: grammar, spelling, along with pragmatic aspects such as politeness.

Children's questions and requests are of particular interest because their usage marks an important distinction between modes of pragmatic utterances. For example, on the one hand there is the ability to use referential pronouns within a sentence (anaphoric constructions) which reflect pragmatic ability (Karmiloff-Smith, 1979). And, on the other, there is the use of standardised, "non-natural" polite expressions which reveal socialised pragmatic ability, because they directly serve a social end. Halliday (1975) also makes this distinction (p. 70-77) and describes the social functions carried within an utterance, particularly questions, as one "macro-function."

Atkinson's (1979) study of children's speech acts begins with a strong critique of the stress traditionally placed on the propositional function of language (i.e. transfer of information), in relation to the nascent language of infants. He declares: "I wish to take issue with the claim that the propositional function is 'basic' and suggest that, if we interpret 'basicness' as having implications for ontogenesis, one particular nonpropositional function is more fundamental to the development of language." (p. 230) This serves as an introduction to his discussion of children's linguistic attentional devices. Atkinson observed that children can and do use interrogatives as attention-seekers *as early as they can produce them*. He provides an example of a child looking at a clock and uttering: "what that clock?", looking at a flower and saying: "what that flower?" His suggestion is that the speech act's illocutionary intent is to initiate the attention and interaction of the listener. Ochs, Schieffelin and Platt (1979) also cite Atkinson (1973) who reported one child using "where" as an attention-getting device by announcing he had just found an object by saying "where [object]?" This occurrence, if generalisable to other children of the same age, would seem to exemplify utterances which could only be understood in a contextualised way.

The study of the form and function of children's questions has helped provide clues to their cognitive development. Tyack and Ingram (1976) provide a description of the sequence in which children master different types of interrogative constructions. The first they tend to produce are *what* and *where* questions, which are thought to reflect the early search for labels and spatial relationships (lost toys). Later, the more abstract *how*, *when* and *why* questions appear in their repertoire of queries. In terms of comprehension a similar pattern has been reported. Tyack and Ingram cite Ervin-Tripp's (1970) study which identified an approximate age of 3 years, before which the more cognitively demanding *why* and *when* questions were commonly answered incorrectly with a response that appeared to reveal the child's best attempt at interpreting what information was required. This often ends up being a "guess" based on the semantic features of the verb, or the object of the verb is used as the answer.

It is of particular interest to examine children's interrogatives which serve a social function that lies entirely outwith both the structure and semantic content of the utterance. This type of verbal behaviour clearly is difficult to study. It may be elusive, firstly because the grammatical immaturity of a child's speech may obscure their pragmatic ability (as discussed earlier); and secondly, it is common to assume that their level of cognitive development precludes them responding to subtle social

needs and norms, such as maintaining conversational flow, turn-taking, etc. This type of assumption originates with the work of Piaget (1926). Indeed, Dore and McDermott (1982) point out that "speech is both structured and situated, a central problem for any theory of utterance interpretation is to determine how grammatical knowledge interacts with participants' interpretative procedures for arriving at mutual understanding." (p. 374)

Vaidyanathan (1987) examined the function of children's questions, particularly the "wh" questions. A important point that is made is that for most questions posed by adults to very young children, the answer is already known, and thus the question serves as either a prompt or some other rhetorical form. Young children may model their own questions from what they commonly hear, and thus perhaps there is a connection between this possibility and the interrogative speech acts observed by Atkinson. One might postulate a *mode* ("test questions") that for children is imitative in origin, but a *function* which is innately social and pragmatic. Vaidyanathan writes that: "In such situations (questions from adult to child) an adult tends to use interrogatives as one means of initiating and sustaining interaction with his/her verbally-limited conversational partner. Thus in a sense, the interrogatives serve a social function." (p.536) Such adult-to-child questions might be described as repetitive and perhaps stylised discourse initiators (Vaidyanathan, 1987). Indeed such speech acts may justifiably belong in what Wertsch (1991) calls a "speech genre." These are loose groupings of similar *types* of talk that exist on a purely functional, social level and represent *modes* of communication. He quotes Bakhtin (1986) who wrote that "a speech genre is not a form of language, but a typical form (a type) of utterance; as such the genre also includes a certain typical kind of expression that inheres in it. In the genre the word acquires a particular typical expression. Genres correspond to typical situations of verbal communication, typical themes, and, consequently, also to particular contacts between the meanings of words and actual concrete reality under certain typical circumstances." (p. 87) Examples might include legal talk, political speech talk or perhaps mother-to-child type talk. If questions, such as "and what is that called?" or "where does that go?" as described by Vaidyanathan can be considered in this way, it is plausible that very young children will respond not only to the requests for information explicit in them, but also the implicit social function they serve. They may learn, in other words, that this is the way one normally maintains or initiates conversation.

Vaidyanathan (1987) provides an analysis of questions posed by children all under the age of three. Several categories of "non-information-seeking" questions are identified, one of which is "promoting conversation" questions, which bear a striking resemblance to those attributed to adult behaviour: rhetorical questions, directed to the conversational partner, to which the child knows the answer already. Both adults' and children's use of such attention seeking and conversation initiators and their typical structure are also discussed in detail by Ochs, Schieffelin and Platt (1983).

James and Seebach (1982) conducted a study which examined pragmatic awareness in children's questions, and they point out the familiar function served by young children's *what* and *where* questions. These types of questions appear earliest (Tyack and Ingram, 1977) and "are closely tied to the child's immediate environment and refer to the names and locations of objects and people." (p. 2) They acknowledge "test questions" (where the answer is known already) as something even young children use to initiate or maintain conversational flow. In their observational study of children, ranging in age from 2 to 5, such questions were observed in a considerable proportion of even the youngest children (15%-20% of all their questions). Such conversationally facilitating questions increased with age, and constituted approximately 37% of the 4 year olds' questions.

Similar categories appear in the work of Bruner (1983) and others (e.g. Przetacznit-Gierovka and Ligeza, 1991). One is *invitation requests*, directed toward adults to prompt them to participate in a joint social, playful activity. Bruner in particular describes a third category, *request for supportive action* where children elicit an adult's skill or strength to achieve some task/game goal. He does not suggest, however, that for preschool children, they can function as one and the same, that is, where requests for support simultaneously serve to socially engage the parent. Przetacznit-Gierovka and Ligeza also describe these functions, but do not imply that there is any overlap. Nor does Halliday (1975) who asserts that for "proto-language" users before two years of age ". . . it is impossible to mean more than one thing at once." (p. 71) He does suggest the possibility for such an "integrated structure" (p. 71) in later linguistic development, at around five years of age.

Sinclair and Van Gessel (1990) discuss a descriptive study they conducted, involving three-year-olds, and emphasise their attention to contextual clues in understanding children's meaning. They preface their study with an introduction which highlights

what is essential about analysing the pragmatic function of utterances. Beginning with form and function they point out that "within any functional taxonomy or description, most often any form can be used to fulfil almost any function, and vice-versa, that a particular form may fulfil many different functions in conversation." (p. 924) In their introduction they assert that "We chose to study children's conversations because we were interested in finding out how questions are actually used in child-child communication in natural settings. . . ." (p. 925)

In developing a taxonomy of speech act function, their stated mission was to concentrate "on the speaker's intent - that is, what we as observers thought the speaker was trying to accomplish with his utterance at that point in the context." (p. 930) Their analysis of the children's questions identifies several important social functions such as proposals or invitations for joint activity. Their largest category of questions, "attract attention" was described as a means of involving the partner in their own actions or shared visual events. By putting requesting and questioning utterances in a social format in this way they are proposing pragmatic activity which is socially engaging. However, Sinclair and Van Gessel (1990) and others they cite, although they imply possible social motivations in "test-questions," do not include them within their category of "attract-attention" questions, or conversational questions. James and Seebach (1982) also identify the pragmatic nature of some questions as "conversational questions." And others (e.g. Bates, 1976) describe indirect requesting. However, their examples (e.g. "You know what?" and "How are you" and "can you take the baby [doll]?") though technically are linguistically indirect, do not depart from language which makes reference to the other person, and thus is *socially* direct, i.e. they may engage the other person by referring to them. Mey (1993) describes such utterances and points out that: "the observation that indirect speech acts (despite their name) in many cases are the most common, 'direct' realisations of what we have come to know as 'illocutionary force'. . . one could ask whether it would not be wiser to concentrate on the pragmatic aspects of that force, rather than to try and establish watertight semantic and syntactic criteria for individual speech acts and speech act verbs." (p. 145-146)

Like the other researchers mentioned (Bruner 1983; Przetaczni-Gierovka and Ligeza, 1991) most other researchers do not seem to go so far as to hypothesise production or comprehension of requests for help which in a thoroughly indirect way serve a social end, at least not among three-year-olds. One can find researchers making tantalisingly

suggestive comments however. Sinclair and Gessel (1990) write that attention-seeking questions (their largest category) serve to socially draw-in the listener and that "Naturally, the question whether these functions are realised by other forms of talk - and how often - arises, but we cannot answer this question at present." p. 938 Specifically referring to the link between social motivation and linguistic form, Ervin-Tripp and Miller (1977) point out that "answering questions is among the first clearly discourse bound obligation to which children are sensitive. . . It is the case that the structural organisation of language centres on its unique evolutionary function of information exchange, it would not be surprising if many other functions piggybacked on the obligatory replies to information questions. In these cases the facade of information exchange is used for other purposes." (p. 14) Sinclair and Van Gessel (1990) also point out that apart from the transaction of information, questions ultimately serve as a "powerful means of turn allocation." (p. 938)

Vaidyanathan's analysis of children's questions does identify a class of social interrogatives ("Promoting conversation") and includes within this, questions which function socially, but are linguistically more remote from their semantic content. From this corpus are presented examples such as a child repeatedly posing ostensibly *information* questions to his father, which he quickly answers himself (e.g. "*what is he doing?. . . he is bathing*" and "*where has the baby gone?. . . here, it is!*") (p. 547) An interpretation of the social function of these questions remains inconclusive though a desire for joint attention seems likely. They do, however, serve to demonstrate common "information-seeking" where the answer is already known. Unlike most analyses of children's pragmatic questions, examples like these mirror the wide variety of adult questions which serve a social function mainly outwith their literal content, "nice weather, isn't it?" being perhaps the most familiar. Some speech acts are indirect, but are so common that their meaning has become routinised and conventional, such as "can I have the salt?" (Ackerman, 1978) Others however, have a perlocutionary force which derives solely from the context in which it is uttered. Ackerman's study examined children's understanding of directives of this type, such as "it's 10 o'clock." where the gloss is "time for bed." His findings suggest that children are capable of understanding extra-linguistic meaning. Unfortunately, his youngest children were at least 5, thus the true boundaries of comprehension were probably not tested.

2.12 Alternative approaches to language development

There is not a clear consensus as to the form and extent of children's abilities to produce and comprehend non-literal illocutionary force in questions and statements. Research has managed to convincingly demonstrate that grammatical/syntactic proficiency is not a strict prerequisite for pragmatic utterances. The one-word directive, contextually appropriate (if not semantically appropriate) greetings, understanding of contingent questions and such, seems to show this. Most all contemporary researchers, including those mentioned previously, have ascribed pragmatic ability to even preschoolers. What seems in question is a matter of degree: how oblique can a reference be and still be understood and/or produced by a preschool child? The discussion of the social function of "test-questions" used by children has perhaps pushed the plausible abilities of children furthest.

On a more theoretical level, others have pre-empted this hypothesising by turning up-side-down the conventional process of language acquisition. Mey (1993) writes that: "Interestingly, when we look at the developmental aspects of pragmatic acts, it seems to be the case that children learn to deal with such uses of language long before they discover the existence of 'real' speech acts. . . Learning how to manage speech acts, including their 'correct' verbal uptake, occurs later in the child's life than learning to respond to them in the form of an appropriate action." (p. 262-263) He also cites Jacobs and Jackson (1983) who proposes that: "children have to learn that a literal response is possible." (p. 295)

Still other conceptualisations of children's language acquisition can be found which diverge from the traditional structurally-based ones. Wertsch's assertion is that the developing "voice" entails both the semiotic nature of language and the understanding that human mental function is bound up with the communicative process itself. Taking the concept of semiotics even further, Halliday (1975) in his chapter on semiotics in language development, defines the process as "sociosemiotic." His description of this concept implies that this is more than a simple combination of sign learning in a social context (as the term would suggest) but that there are orders or hierarchies of semiotic process. He writes that language is a: "synthesis of three modes of interpretation, that of language in the context of the social system, that of language as an aspect of a more general semiotic, and *that of the social system itself as a*

semiotic system. . . The meaning potential of a language, its semantic system, is therefore seen as realising a *higher level system of relations*, that of the social semiotic, in just the same way as it is itself realised in the lexico-grammatical and phonological systems." (p. 60, my emphases)

This would seem to imply that while conventionally we have units within a semiotic process that include letters, morphemes and words, we may also have higher level units, that exist only on a social and cultural plane, but are just as distinct. Perhaps children's apparently very early use of "test-questions" and other pragmatic devices might be considered units of Halliday's "sociosemiotic system," and examples of Wertsch's (1991) "speech genres."

2.13 The primacy of conversational motivation

This last statement seems to over-simplify the issue, but as other research has demonstrated, the inclination to behave in a social and conversational manner is extremely fundamental and perhaps innate. As discussed briefly in Chapter 1, research since the early 1970's has explored the nature of parent/infant interaction and has in doing so revealed, not merely the potential, but the ubiquity of highly synchronous, and surprisingly early, mutual communication.

Trevarthen's (1994) discussion of semiotic development seems to closely parallel the theoretical perspective of Halliday (1975) above. He writes:

In the first communication games infants play with their mothers we may observe an intelligence that has impulses to share ideas and fix meanings in a *conventional code* . . . The infant, we find, is even more than a self-sufficient experienter and problem-solver, even more than a thinker. His or her cognition is endowed with the appetite to learn by picking up cultural ideas from a community of others. It exhibits an innate intersubjectivity that is adapted to cultural learning." (p. 219, my emphasis)

He also points out that the word "symbol" originates from the ancient Greek meaning "thrown together" and asserts that "it is something made by persons agreeing together or making a contract. It is a meaning shared . . ." (p. 239) This social-semiotic is argued by intersubjectivity researchers to be observable in infants from birth. The evidence they provide is not related directly to actual linguistic symbols but behaviour described as "protosymbolic." (Trevarthen, 1994, p. 219) This includes any behaviour

which actively attempts to conventionalise basic social communication, within which a purely linguistic symbolic system can develop. An example cited by Trevarthen (1990, 1994) is neonate imitative behaviours as observed by Kugiumutzakis (1985). Another phenomenon which typifies the innateness of infant sociability, according to Trevarthen (1990, 1992) and others, is their apparent ability to use turn-taking, and matching of rhythm and tone in communicative interactions with their mothers. Though no "proper" language is exchanged, all the pragmatic structures necessary for normal mature conversations are present.

As expressed in the previous chapter, it seems that this extensive range of communicative abilities in infants, of which only a few are described here (see Trevarthen, (1992) for a comprehensive review), is very much tied to the sensitivity and intersubjective motivation of the adult partner. In most examples that are discussed in the literature, this person will be the mother or long-term caregiver. This person logically would be the adult who would be most capable of interpreting the child's meaning, something which according to most communication theorists is contextually negotiated. Adults less intimately familiar with a child cannot, it seems, be as highly aware of how that child constructs his or her context at any given time. One such linguistic context, as discussed in the previous section, is the one of social invitation which may occur through the "speech genres" of test-questions, conversation prompting questions (e.g. "Know what?") and the like. These, if produced in a setting that (to an adult) is not particularly social or playful (e.g. task-settings) may only be interpreted literally. Indeed, any mis-understanding might even be compounded by gender effects if there are particularly strong expectations about what male and female communicative motivations exist. This is an issue which will be addressed directly by the experimental work in this project.

2.14 Establishing "context" in adult-child interaction

"Context" is an extremely broad term often nebulously used by psychologists, linguists, philosophers and social anthropologists alike. For many modern communication theorists (e.g. Coates, 1993; Tannen, 1993; Gilligan, 1992) contextual analysis is the essential everyday tool for deriving utterance meaning. For many post-modernist philosophers it is the ultimate enigma that can never be objectively understood, because of intrinsic personal bias of any observer². Coulter's (1994)

² Contemporary art has often capitalised on the mystique of contextual

paper is an attempt to rein in some of relativist zeal which has characterised the recent philosophy of language and culture literature. He cites Derrida (1977) who asks, ". . . does the notion of context not conceal, behind a certain confusion, philosophical presuppositions of a very indeterminate nature? Stating it in the most summary manner possible. . . a context is never absolutely determinable. . . its determination can never be entirely certain. . ." (p.693)

Referring to such philosophical comments as: "Meaning is context-bound, but context is boundless" (Culler, 1982, p. 123), which implies we can never be sure of what anyone ever means by saying anything, Coulter rather pragmatically points out the logical fact that humans, as part of everyday survival can and do make contextualised interpretations of what others say. To argue the opposite suggests that all humans exist in a perpetual fog of misunderstanding, missed allusions, and tripped-over metaphors. In fairness to post-modern/post-structuralist philosophers, the "boundlessness" of context is often a direct critique of ethnocentrism, not the work of linguists and psychologists.

One can find that the problems of analysing the meaning of any "context" have been a central preoccupation in philosophical and sociological circles. Habermas in *The theory of communicative action* (1984) in discussing sociological study, outlines the "three world" theory of Popper, and adds a fourth relating to "communicative action" The three worlds involve first the world of physical objects and events, secondly conscious states of mind, and thirdly, objective contents of thought, especially scientific and poetic thoughts. Habermas' fourth "world" is that of communicative action which:

. . . refers to the interaction of at least two subjects capable of speech and action who establish interpersonal relations (whether by verbal or by extra verbal means). The actors seek to reach an understanding about the action situation and their plans of action in order to coordinate their actions by way of agreement. The central concept of interpretation refers in the first instance to negotiating definitions of the situation which admit of consensus (p. 86).

Thus in the above quote, there is the concern with the construction of "context" which for Habermas is created (among other things) through joint intentionality, both in

interpretation, specifically the philosophical problem of the 'gaze' of the viewer (painter, photographer) as an objectification of the viewed.

communication and action. However, it is highly likely that in his writing he is referring to adult interaction. As discussed by many linguists and speech act theorists, this system of negotiated meaning through shared communicative and action goals *usually* assures smooth transmission of messages and their uptake and understanding. Grice's (1957) conversational maxims describe the "laws" which ensure intelligibility. They rest on the assumption however, that two people share the same "reality" and thus are in the same "contextual space." Communication works so well on the whole, among adults, that perhaps interpretative presumptions can occur when interacting with young children: for them contextual boundaries may not map onto those understood by adults, thus creating possible mis-matches in communicative intent and message interpretation. This may especially be the case if it can be shown that very young children can use language to promote social interaction, and that this occurs in settings which are more likely to be seen by adults as *task-oriented*.

2.15 Adult bias in the interpretation of language and ability

A broader issue, and an important related interest in this research, is the goal of maximising every student's potential and making the widest possible range of academic and professional choices available. This is an ambition which encounters one of its greatest obstacles in the resilience of gender bias. Bias may take effect either by shaping the child's own motivations and desires as they assimilate the permanence of his or her gender (e.g. Bem, 1981) or through the implicit expectations and directives of his or her peers, parents and teachers. This discussion does not include the nature and degree of genetic differences, because the argument for a genetic inclination for children to behave in any particular way may be largely irrelevant to the issue of what any *individual* girl or boy is actually interested in and capable of achieving.

Women, historically, have had their academic and professional achievement severely curtailed. Generally, it is females who are steered into behaviour patterns, such as particular speech styles, which, as argued earlier, do not inherently carry any aptitude-related information, but with time become associated (often times in an illusory way) with less professionally, if not socially, valued behaviours. One example might be the perceived connection between compliant behaviour and intellectual ability. One way this may occur is through the cycle of biased social

instruction and biased achievement expectations (e.g. Bates, 1976; Scrimgeour, 1993). Perhaps the most well known experimental examples of this are provided by the series of studies (Babad, Inbar and Rosenthal, 1982; Babad and Inbar, 1982; Babad, Bernieri and Rosenthal, 1989) which in sum provide a remarkably complete model of how teachers' personality, children's individual (ethnic) differences and teachers' achievement expectation for children can all interact to form a cycle of bias which, if negative, can affect the achievement potential of children. Thus one main aim of this research is to identify possible gender differences in very young children's communication which in some contexts, particularly formal problem solving, may contribute to biased feedback system described by these and other researchers (e.g. Taylor, 1979; Harris and Rosenthal, 1985).

2.15.1 Problems of context and adult interpretation of children's utterances

One problem with studying teacher bias is that in reading the literature one realises that it is highly context-dependent. As discussed in Section 2.2, in the search for causal factors in speech styles, particularly "dependency" language, there are rarely any clear connections between socialisation pressures, which are readily observable, and adult subjective evaluation of ability. There are strong opinions expressed (Coates, 1993; Tannen, 1993) through the description of socialisation which teaches young girls to communicate in ways which are destined to later put them at a disadvantage with male peers and lead adults to equate their style of interaction with "natural aptitudes" and "natural deficiencies." However, in spite of strong support for these above described "systems" of bias against girls, there remains the important question of whether there is *any systematic* way in which adults are biased toward their students--either positively or negatively. The apparent lack of consistency is readily uncovered in a small sample of the available literature. For example, one finds in Halberstadt and Hall (1980) that teachers' impressions of 3rd - 5th graders' (approx. ages 8-10) cognitive ability judgements did not seem to be biased by the sex of the child per se, but rather was related to their ability to understand nonverbal cues (a facet of communicative fluency). Yet in their study of children in a younger age group, Gold, Crombie and Noble (1987) as mentioned earlier in Section 2.4.2, found that teachers hold sex-contingent beliefs about ability. Their evaluations of girls' competence was predicted by *compliance*, where girls who were perceived as more compliant were viewed more *positively*. They report that these girls were reinforced for compliant and acquiescent behaviour since they tended to receive higher grades

than other girls. A question they do not address however, is whether higher grades occur as reward for "good behaviour" or truly reflect judgements of intellectual ability. Judgements of boys' intellectual ability, in contrast, was found to be predicted only by age and actual IQ. Behaving in a non-compliant way did not prejudice the opinions expressed about the intellectual ability. Gold, Crombie and Noble point out the possibility that effective problem-solving is often later associated with independent behaviour, and that girls receive socialisation pressures away from problem solving independence. As reflected in the available literature, when studying expectation bias, each context variable, including sex of teacher, sex of experimenter, age of children and socio-economic background of all the above, can yield different results.

Buck (1975) reported that in a study of nonverbal communication of affect, the ability to send nonverbal information was positively correlated with teachers' perceptions about activity levels, aggressiveness, impulsiveness, bossiness, sociability, etc. whilst being negatively associated with shyness, cooperativeness, emotional inhibition and control, etc. Buck cites an earlier study in which females were observed to be better "senders" than men. This would imply that one could expect girls to be more aggressive in their non-verbal communication. However, another observer-bias research example swings in the other direction. Lyons and Serbin (1986) conducted a study of behaviour observation. Both men and women judged the play behaviour of male children to be more aggressive than the females though actual levels of aggressiveness were equal. A similar result occurred in evaluations of the children's drawings depicting children interacting.

A very different result was reported, albeit in a different age group, in the study by Newcombe and Arnkoff (1979). In this paper they review the work of Lakoff (1975, 1977), who studied speech styles and concur with the conclusion that females use more tag questions (equivocations at the end of a declarative statement, for example: "it's really cold in here, *isn't it?*") along with more qualifiers such as "you can go, *I guess*" or "maybe it's this way." and more requests rather than direct commands (e.g. "won't you close the door?"). Along with these types of phrases they cite the key assumption posed by Lakoff (1975) regarding the social implications for their usage: 1. Firstly that there are indeed differences in the frequency of use; 2. that this different language style does influence how people are perceived; and 3. that perception can be modified in a way that could have some social impact. In a study testing these assumptions, Newcombe and Arnkoff concluded that, for the most part, they are

indeed valid. They used 138 students who listened to a series of conversation segments, which included tag questions, qualifiers, and compound requests spoken by *both* males and females. The subjects were instructed to rate the assertiveness, politeness and warmth of each speaker. The results indicated that tag questions and qualifiers did lessen the perceived assertiveness of speech. However an interesting result was that it was speech style and not sex which was linked with lower perceived assertiveness. In this study the implication is that stereotypes follow or stem from affective differences and, as put by the authors "when men and women do differ in frequency of usage of these three linguistic forms, the contribution to the support of sex stereotypes could be substantial." (p. 1299)

Generally the studies discussed are not parallel examples, in that they almost never test the same phenomenon (e.g. ability perception and communicative assertiveness) across several contexts (e.g. age, background). Thus any one study may need to carry the implicit disclaimer that their "cause" of bias may include, but is not limited to, that particular context; and that bias will occur under certain conditions, but possibly not under others. This exemplifies the problem in generalising about any adult-child interaction and potential bias. One can, however, identify the differences between bias which originates in the adult and comes to bear upon the child, as in Mazur's (1987) study and Gleason and Weintraub's (1978) study and bias which is part of a more complex interaction that may begin with a gender difference among children, be perceived and interpreted by adults (possibly inaccurately) and reflected back upon the child in an evaluative judgement. This latter type of bias was elaborated upon by J. Bates (1976) who very aptly describes the problem with communication and bias towards children. "A child does not merely have an effect, or even an effect which is part of an adult-child feedback loop; he has an effect on a particular adult in a particular context. This issue of mediating variables, which has not yet received systematic empirical attention, complicates the study of child effects." (p.1079)

J. Bates (1976) used adult subjects who played the role of teachers interacting with confederate children, aged eleven. The children were instructed to behave in either of two ways: with *high positivity* (attentive, friendly) or *low positivity* (little eye contact, less friendly). The results revealed that the "teachers" who interacted with *high-positivity* children reciprocated with higher nonverbal positivity and gave higher performance evaluations. Bates raised the obvious issue of self-fulfilling prophesy, as well as possible inhibition when encountering new learning experiences. Gender

differences in Bates' study were not part of the main effect. However, he did note among the male subjects, a slightly more positive response to the *low-positivity* children's visual contact than to the *high positivity* children's. By contrast, the female subjects gave higher positive feedback to the high-positive children. No explanation for this was suggested in his paper. However, it has relevance to a contemporary experiment by Zuckerman, Hall, DeFrank and Rosenthal (1976). In a study using 60 male and female undergraduates, they tested the relative abilities of males and females to encode (send) and decode non-verbal communication. They reported greater decoding ability among the females. Also among the results was a positive correlation between emotional response and sending ability in both conditions and a strong correlation between spontaneous and posed non-verbal communication. When reading Bates (1976) and Zuckerman et. al. (1976) one might consider the possibility that the gender difference in decoding ability reported by Zuckerman et al. is the *same* phenomenon behind the findings of Bates. This would imply that the assessment differences reported by Bates, might really be differences in nonverbal decoding accuracy. If this were so then testing any theory about the child-teacher dynamic that may create gender bias must also include the variable of gender of the adult, whether it affects his or her communicative ability (as in the Bates and Zuckerman et al. picture) or expectational attitude. This might be particularly important because of the large disparity in numbers of male and female nursery and primary school teachers.

2.15.2 Philosophical and practical treatment of "context"

The possibility of adult bias in the interpretation of children's behaviour, particularly their task-related speech acts, is clearly an important issue for education and a potential problem for any child's developing identity: their sense of self-reliance and achievement expectation. It is an issue, which in light of communication research, seems integrally connected to adult expectations about how and when language develops, and especially related to their sensitivity to the child's concept of "context."

Thus when studying communicative interaction, particularly between adults and children, it seems very important not to underestimate the complex combinations of factors which inter-mesh to form what psychologists and linguists define as "context." As mentioned in the discussion of pragmatics (Section 2.5), "context" exists on a grammatical level, as in the case of anaphoric pronoun use. It occurs on an inter-sentence level, where sequential analysis is necessary to elucidate the meaning of one

utterance through the meaning of what occurs either before, or after it. Perhaps the most familiar level of "context" is the situational characteristics of an utterance, that is, what is "going on" socially between people which gives coherence to the words they exchange. The critique of contextual interpretation by de-constructivist philosophers centres on the worry that the human gaze (observation), no matter how standardised and systematic (scientific), is intrinsically subjective, and thus either ego-centric or ethnocentric. This is an inherent problem. Fortunately, it is one which provides its own inherently functional solution that is grounded in the effectiveness of everyday communication.

Analysis of context is essential for meaningful interpretation of speech acts, particularly children's. For intersubjectivity research, great importance is placed on the concept of making contextual interpretation, especially since many of the "interlocutors" engaged in the conversations are actually pre-verbal. The "problem" of subjectivity is re-defined by boldly stating that all observation is subjective, all social scientists are human and that the attributing of intentional or cognitive states to others is directly validated by the fact that it occurs naturally and extremely successfully all the time. This is the position of Trevarthen and Marwick (1982) who write that,

Awareness of the appropriate level of psychological control does not present as much difficulty as is often assumed by psychologists, after all the success of daily life with intricate mutual adjustments depends on it. We could never understand one another if we could not easily perceive the meaning in behaviours of others, as well as make acts of our own which they can follow (p. 19).

Thus, according to this standpoint, meaningful interpretation can be accomplished with a system which utilises a functional taxonomy based on natural human interaction, which is culturally bound, but not idiosyncratic, and thus reliable across other observers. This is the underpinning standpoint that has been taken in the development of the coding system used in the experimental work for this project.

2.16 Research questions

The intersection between contextual interpretation and the meaning of communicative action as a methodological issue has been carefully and often successfully negotiated by intersubjectivity researchers and developmental linguists. A combination of approaches will be used in this research that attempts to take the most fruitful

elements of differing methodologies: contextualised and naturalistic definitions of speech acts and detailed sequential analysis, along with relatively large sample size and use of inferential statistics. The experimental work for this thesis will explore children's spontaneous communication in a challenging problem solving task. Of specific interest in Studies 1 and 2 is the relative frequency of children's help-seeking utterances along with neutral and confident utterances. The grammatical structure of their questions and statements, as important factors affecting the "meaning" of utterances, will also be examined. Later, in Study 3, the issue of adult interpretation of help-seeking (with regard to task-ability) will be addressed. What is at issue in this set of studies has been introduced through previous discussion of the literature, and is summarised below. The order does not, however, represent relative importance, because as methodological and theoretical issues they cannot, in practice, be isolated or placed in a hierarchy, but rather are highly inter-connected.

- *Do preschool girls and boys express themselves differently in formal problem-solving settings? Can communicative differences, if any, be shown to have any relationship with how well they cope with a challenging problem?*

A central aim is to explore gender differences in language and interactional style. There is now a wealth of research which has overcome the constraints of the nature/nurture question (mainly by recognising the artificiality of the question) and has confidently identified very real structural and stylistic differences in the way males and females interact (see Section 2.8). In past decades there has also been a great deal of research purporting to show gender differences in confidence, self-reliance and expectation for achievement. Though more recently disputed, these latter constructs are often simplistically linked to female interactional style (deference, cooperation, self-deprecation) to create a very compelling heuristic for "femininity" where language use becomes the "self-evident" manifestation of internal expectation and motivation for achievement. The experimental work of this research (Studies 1 and 2) is to critically examine performance on a challenging formal task, and to study the moment-to-moment relationship between task-performance and communicative behaviour, with particular focus on "dependency" utterances.

- *Can communicative behaviours be reliably identified in a formal task-setting, which might indicate areas of indirectly social language which might be interpreted by an adult as being only task-related?*

Much of the research discussed has concerned children's communication. Most often this research has employed "social" or "play" settings to study social behaviour. For the abundance of verbal behaviour, this choice seems logical; however, scarcity of research studying social behaviour within formal task-settings may reflect the presumption that there will be functionally different types of communication occurring in play settings versus "serious" or task-related settings. Thus in an indirect way the surface interpretation of this particular context (as a formal problem setting) is questioned, by discussing generalised presumptions about what kind of talk will be deployed by a preschool child in a formal task-setting.

- *If preschool children's "help-seeking" utterances do not necessarily reflect a desire or need for help, (and may possibly be indirect, socially facilitating language), will adults, in spite of the "formality" of a problem-solving exercise, be able to attend to the extra-linguistic, social meaning, or will they be influenced by a literal and strictly task-related interpretation?*

To some degree, an adult's interpretation of a child's perlocutionary intent will depend on what they believe the child is linguistically capable of. The literature on developmental pragmatics and intersubjectivity has in the last two or three decades radically modified the time frame (and indeed the order) in which children begin to apprehend and put into practice pragmatic awareness. The ability and inclination to produce pragmatic language, particularly that which is indirectly social, is examined in this research, as part of the concern with typical adult construction of "context," and therefore the interpretation of children's ostensibly "task-related" utterances. Besides asking "can children employ this kind of pragmatic language in a challenging formal problem-solving setting?", this research is concerned with how naive adults might interpret such behaviour, considering the "clarity" of the context ("serious," rather than "playful").

CHAPTER 3 PILOT WORK

3.1 Aims and scope of Pilot Study

Some of the main research questions for this work, as well as a rough framework for methodology emerged from earlier MA work (Thompson, 1989) conducted in the area of children's verbal behaviour and gender identity development. Initial pilot work for the present research was undertaken to allow a brief re-examination of behaviour occurring in the context of a structured problem-solving situation. This would provide some rough confirmation of trends observed earlier in regard to help-eliciting¹ behaviour and performance. However, previous work had been conducted to study cognitive development (e.g. gender constancy) and social learning, as possible factors in language style differences between males and females. Help-eliciting behaviour emerged as a dominant gender difference. Using the label "help-eliciting" to describe the behaviour observed was acknowledged then to be overly simplistic, considering the failure to find performance differences. It was not within the scope of that research to begin a full study of the complex relationship that communication may have with the particular context, and task-performance. This became the central issue for this research.

A main aim of this pilot work was to explore techniques that would be effective in undertaking a detailed study of language use and problem-solving behaviours; another was to make decisions as to the most appropriate setting, problem-solving task and subject group for the Study 1. Previous work had employed only audio taping, which had clear limitations. The pilot study was designed to utilise both video and audio taping, to allow analysis of both verbal activity and accompanying visual data regarding each child's progress on the task.

¹ For the experimental work described in this thesis, the term "help-eliciting" is used rather than the more familiar "help-seeking." This is to reflect the degree of uncertainty with regard to conscious intentionality behind these speech acts, thus providing a term which instead describes their expected effect upon an adult listener.

3.2 Development of the experimental setting

3.2.1 Selection of subject group

The decision to focus this research on nursery-aged children is directly connected to the underlying hypotheses regarding adult interpretation and subjective evaluation of children's behaviour within the larger framework of social learning. As described in Section 2.15, there is a great deal of research (e.g. Taylor, 1987; Babad and Inbar, 1989) which has succeeded in demonstrating the impact of both negative and positive feedback from adults, which in turn is often a function of subjective interpretation. There is also a vast body of research which describes the breadth and primacy of social learning (e.g. Fagot and Hagen et al., 1985) as well as the likely sensitive periods for identity and gender-role formation (Marcus and Overton, 1978). These sets of findings together (Section 2.2), suggest that behaviour, especially of an ambiguous nature such as task-related help-seeking, may have an impact on observer evaluation at a crucial age in children's identity formation.

One main research aim, therefore, is to examine language use at the earliest possible age that is feasible considering likely time and access constraints. Nursery-aged children were likely to be the youngest group which would allow a relatively large-scale study using the depth of analysis that would be employed. The aim for the pilot study and the subsequent full-scale study is to examine closely task-oriented communication, to determine if any substantive gender differences can be observed that might have a biasing effect upon naive observers, *and* to make these observations within an age group that would most effectively speak to the issue of socialisation of sex-typed behaviour development and self-fulfilling prophesy. For the Pilot Study, children from the Department of Psychology Nursery were used. The sample in the pilot study consisted of 24 children, 13 girls and 11 boys, ranging in age from 3;3 to 4;10, with a mean age of 4;1. The children were all from the Edinburgh area and were from middle-class families.

3.2.2 The Experimental setting

The empirical work for this project is based primarily upon the analysis of children's verbal behaviours that occur spontaneously in a structured, task oriented setting. It is necessary to discuss the setting itself in order to establish fully the reasons behind the

use of this type of physical context. These reasons pertain to the practical constraints of data collection from nursery children and to a more conceptually fundamental intention relating to the aims of the study.

The pilot study was conducted in the University of Edinburgh, Department of Psychology Nursery, during normal nursery hours. The children were brought to one of the quiet, small, purpose-built rooms, downstairs from the nursery. This type of setting was used for the obvious benefits of fewer distractions and interruptions. It is acknowledged that unstructured classroom observation of children and their peers interacting can provide a rich source of communicative behaviour, replete with fascinating developmental changes in language, identity and gender role formation. As many researchers and teachers have asserted, these developments may primarily occur as a function of children's interactions with each other (e.g. Paley, 1987). Most literature on children's use of language derives from naturalistic or semi-naturalistic observation. Such a setting would indeed be essential for studying the cooperative and collaborative nature of peer problem-solving. However, in this study there is a specific intention to examine closely task-related use of language in relation to performance. One main aim therefore is to examine language and critically evaluate in one discrete area, the distinction commonly made between "being sociable" and "being task-oriented." A study looking at task-oriented language use and performance in the naturalistic setting would prove to be extremely difficult because of the uncontrollability of a performance measure, and the rapid interchange between "being overtly sociable" and being "task oriented." The setting of this study, as structured and separate from the nursery classroom, was partly a methodological necessity: a quiet observational setting limited "noise" (in both senses of the word). The setting was (for the child) out of the normal social context, so it also served to naturally limit overtly sociable language. Normally this would be a serious limitation to any study on social behaviour. However, in line with the research aims, the task-related language which is then observed can be better assessed, in terms of its actual relationship with performance, and may provide clues as to subtle gender differences in communication, such as socially facilitating language which may exist on a level impossible to reliably detect in an unstructured group setting.

3.2.3 Selection of appropriate problem-solving tasks

Prior to the actual running of pilot study trials, time was spent in the nursery classroom with the children, partly to get to know them (see Section 3.3.2), but essentially to explore possibilities for problem-solving tasks which would later form the focal point of the research. Jigsaw puzzles were chosen as the problem-solving task that children would be asked to complete. There were several important needs inherent in the study which made such tasks the obvious choice. The central aim of this research is to examine children's verbal behaviour, particularly help-eliciting. Therefore one fundamental need was to provide a problem-solving task which would lend itself to gradual progress, culminating with the successful completion of the problem. This pattern would provide the best framework around which task-oriented discourse could take place. Many other types of puzzles and problem-solving games were available; however, many did not have the same element of gradual progress, with several sub-problems, where the final solution only became evident in the final moments. They would often have an element of insightful recognition of the solution (e.g. tower of Hanoi) where completion would rapidly follow a realisation of "how it works." In prior experimentation with these types it was found that the task seemed to embody only one unified (logic) problem and as a result, verbal interaction was minimal, especially after the "solution" was realised. Other candidate tasks facilitated steady, gradual progress, with their own embedded sub-problems, but tended to be too unstructured to allow one to objectively measure "success" or "completion." (e.g. building sets such as Lego and Duplo)

Jigsaw puzzles provided a problem-solving context which was found to be the most conducive to verbal interaction. This is mainly because they contain many individual pieces, each one a sub-problem, and so provide a context which creates the most steady flow of task-related verbal behaviour. Jigsaw puzzles also minimised bias in favour of any particular skill, as they require both thematic/pictorial recognition and spatial manipulation, and do not fundamentally depend on the physical coordination of the child. Lastly, they are universally familiar and have general appeal among nursery-aged children.

For the experimental sessions two puzzles were chosen. Both puzzles were made of wood and were of a simple design allowing pieces to slide together, rather than

consisting of inter-locking pieces that require more careful fitting. One was a relatively easy puzzle depicting an aeroplane and was intended as a warm up puzzle. This warm-up puzzle (Figure 3.1) was used for two important reasons. Firstly it presented an opportunity for some initial conversation that tended to focus on colours and shapes, etc. It also provided an important means of establishing a clear level of performance that would be readily apparent to the child. That is, the warm-up puzzle was selected to provide a clear "success" for each child, therefore helping to control for variation in general "mood" and confidence that might be affected by experiences immediately prior to the session. The time spent informally experimenting with different methods revealed that for a child, an unhappy event just prior to the solving session would seriously colour their communicative mood. However, as most parents and teachers probably know, a clear "victory" for a young child can be very effective when attempting a new problem, following upset or disappointment. The second puzzle (Figure 3.2) was selected in order to be particularly challenging, whilst still being appropriate for the age group. It depicted a man in a truck, unloading some fruit. It consisted of four colours, green, yellow, black and red. This puzzle was chosen partly by its appropriate age group marking, but also through a number of test trials with a small sub-sample of the children from the departmental nursery. The selection of the puzzle was to provide a problem-solving experience which was clearly challenging, but not so difficult as to become impossible without assistance.

3.3 Data collection

3.3.1 Video-recording and editing: equipment and procedure

Each experimental problem-solving session was videotaped using an NV-MS Panasonic VHS video camcorder. The camcorder was mounted on a tripod and placed approximately eight feet away in the corner of the room (Figure 3.3). As soon as the child was comfortably settled in the chair, the experimenter started recording, and presented the warm up puzzle. Video-recording continued uninterrupted through the completion of both the puzzles. Videotapes were viewed and analysed in a Panasonic VHS Edit Suite, which was equipped with an AG-6200 Source Machine.

Figure 3.1 Warm-up puzzle for Pilot Study, Studies 1 and 2



Figure 3.2 Puzzle for Pilot Study experimental trials

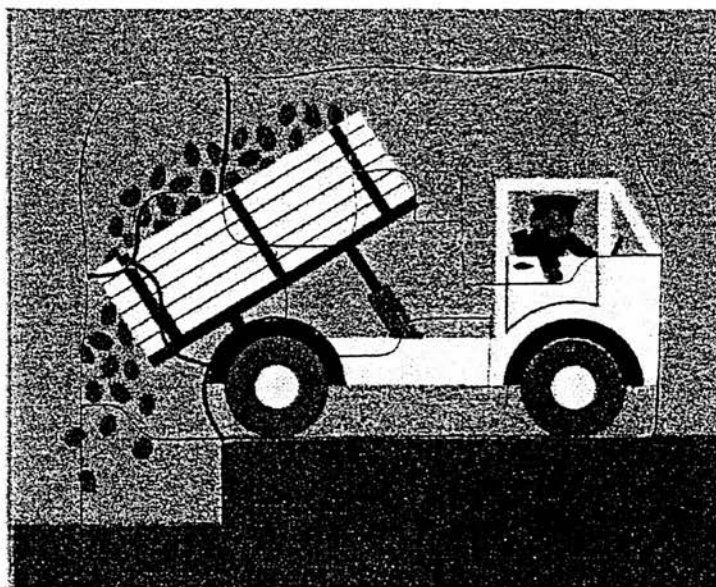
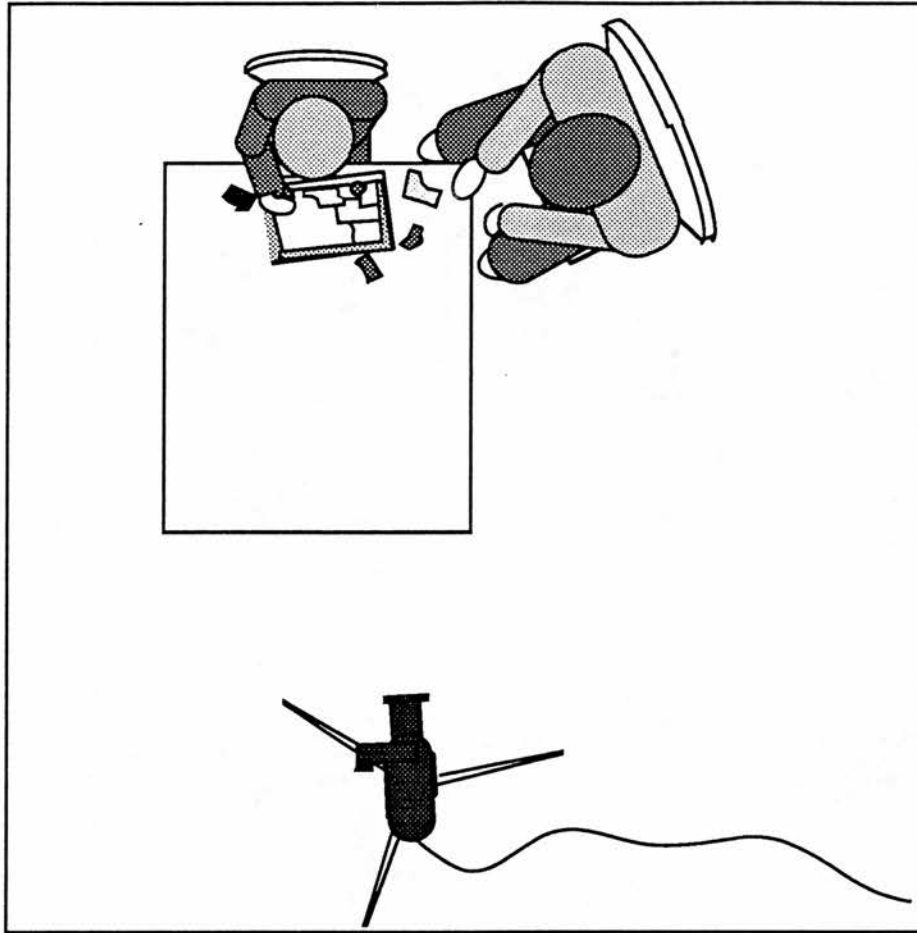


Figure 3.3 View of problem-solving set-up



3.3.2 Nursery and Experimental Setting Procedure

An important consideration was to take all possible steps to avoid confounding effects that might occur simply as a result of the researcher being a relative stranger among young children who are at an age when feeling homesick, having separation anxiety and simple shyness are quite common. Before any experimental trials took place, at least three weeks of unstructured visiting time was spent in the nursery. During this time, approximately three times per week for 2-3 hours, the experimenter got to know the children individually, learning their names, those of their siblings, their favourite activities, etc. Data collection did not begin until the experimenter was thoroughly familiar to all the children, on a first name basis.

For the experimental sessions children were asked if they would like to come with the experimenter to solve a jigsaw puzzle. Care was taken to prevent them from feeling that participating was obligatory. If any child seemed unsure or reluctant, they were reassured that it was all right, and that perhaps they might want to try a puzzle later on. Once in the experimental setting, the child was allowed to get comfortably seated at a nursery-sized table (approximately 14" high). S/he was then presented with the relatively easy warm-up puzzle to solve. After completing the warm-up puzzle, the children were asked if they would like to try another puzzle. Again, if any apprehension was observed, they were allowed to quit and were returned to the nursery. After completing the warm-up puzzle, the second puzzle was then presented.

Before beginning the second puzzle, each child was asked to look carefully at the picture and to describe what they saw. Each major feature of the puzzle was discussed with the child, including the various colours. This was done to make certain every child understood all aspects of the picture, so no advantages due to familiarity would occur between the children. The second puzzle was selected by the experimenter after determining what was available in the nursery, thus avoiding one they may have already seen. They were also explicitly asked if they had seen the puzzle before; and if they had the solving session continued, but the data was not used in later analysis.

During the solving of the second puzzle, the experimenter's behaviour remained neutral, so as not to offer any instrumentally helpful remarks or non-verbal behaviours. However an attempt was made to keep the experimenter's general level of interaction as normal as possible. Thus, if a child remarked upon something not relevant to the problem, such as pictures on the wall, something they had done in the nursery, or at home, these digressions were allowed for a few moments until the child refocused him or herself or the experimenter re-directed their attention to the puzzle.

If a child asked for help or information about solving the puzzle, these questions were answered with a non-committal "I'm not sure" or "I don't know, what do you think?" Once the child had completed the puzzle, which on average took approximately five minutes, they were complimented on their work, thanked and returned to the nursery.

3.3.3 Collation and Analysis of Pilot Study Data

For the analysis of the pilot videotapes, the child's communicative behaviours from only the second puzzle (Fruit Truck) were used. These were examined from their start time to finish time, excluding off-task periods of time. The aim of this pilot study was mainly to explore various technical procedures, and to re-examine some central trends found in earlier work. Therefore, each child's solving period was treated as one large time sample, within which the frequency of verbal and non-verbal behaviours was recorded. Behaviours were recorded from the videotapes directly onto a data-sheet which had columns for the children's name, age, on-task elapsed time in minutes and seconds, "help-eliciting" behaviours, hedges, eye-contacts and total numbers of utterances.

Help-eliciting utterances (HEUs) represented the most fundamental category measure. This category was used as a broad descriptive classification which defined HEUs as any utterance which denoted desire or need for information or knowledge instrumental to solving the puzzle and any direct requests to the experimenter for help or information. Also included in this classification (HEU) were utterances which denoted a negative self-presentation as to ability or progress on the puzzle (e.g. "I can't do this one" or "I'm not going to be able to finish").

The frequency of children's use of "hedges" was also recorded. As described in Chapter 2, hedges are commonly identified as single adverbs, or very short clauses which serve to lower the force or intensity of a declarative sentence. For example, the force of the statement "the office is on the third floor" is diminished when used with a hedge, e.g. "the office is on the third floor, I think." Other examples of hedges that might be attached to a declarative utterance include "maybe" and "perhaps." In addition, children's use of tag questions was also observed. These are very similar to hedging statements and are defined by linguists as short dependent clauses in question form, which are attached to a longer independent declarative clause. These short tag questions temper the declarative force of the overall utterance by questioning the truth of the information which immediately precedes them. A statement such as "today is Friday" for example, becomes less certain in the form "today is Friday, isn't it?"

The use of these linguistic devices was recorded because of their traditional gender-related connection with politeness and deferential behaviour as reported in the literature. It was hypothesised that use of "hedges" and "tags" might also be perceived as a subtle form of "help-eliciting" when observed in a problem-solving context. These represented classifications of all other types of utterances and were recorded as a frequency count per minute for the second puzzle.

"Collaborative expressions," like hedges and tags, was a classification of other possible types of utterances, and were recorded as frequencies per minute. These were defined as any construction which used the words "us," "we," or the conjunctions "let's" or "we'll" (e.g. "Let's try to fit the wheel next").

The number of eye-contacts occurring during on-task periods of the puzzle was recorded for each child. This was the only non-verbal communicative behaviour that was coded and recorded for the pilot study. It was included in the pilot study primarily because of its potential relevance to social motivation and perhaps help-eliciting.

One problem identified with the raw data obtained for each child's verbal behaviour was that it did not control for individual differences in solving time or verbosity. Thus, for example, a particularly quiet child might appear to have used more help-eliciting utterances than others, simply because he or she may have taken a long time to solve the puzzle, thus accumulating more HEUs during the solving session. Conversely, a particularly talkative child asking for assistance a great deal, may have in fact been extremely quick at the puzzle, and thus finish with a relatively low HEU score. In order to control for such individual differences, the raw frequency scores for each verbal behaviour were computed as a frequency per minute as a proportion of all utterances. This was to provide an index measure which could take into account overall puzzle-solving time and total amount of verbal activity, thus controlling for higher scores which may simply be a function of either longer solving time or talkativeness. For example, a child for whom 30 different utterances were observed, 10 of which were coded as HEUs, with a solving time of 3 minutes, would receive a HEU score of .11 $[(10/30)/3]$. For the comparison of male and female solving times, which were normally distributed, an unpaired t-test was used.

One issue which can be raised is the validity of measuring "performance." As discussed above, the choice of using jigsaw puzzles as a means of eliciting task-related communication was based on their relatively clear starting and finishing points. Thus on one level "success" could be objectively measured. The intention of the study was to create a challenging task setting, though one in which the large majority of children could "succeed." Thus their actual on-task elapsed times became the main performance metric, which as a concept requires some validating. In some settings, particularly more social, group contexts, simply measuring elapsed times and using these as the defining characteristic of performance, would ignore the many possible factors affecting elapsed times, which may have no relation to task-ability. Examples include collaborative desires among children, simple social distractions and inevitable competition from other classroom attractions, which would not necessarily be identifiable as "off-task." This issue was addressed in the early test trials. It became immediately evident that the occasion of participating in a problem-solving task with the experimenter in a "special" room seemed to foster an unusual level of attention and effort among all the children. Discussions with nursery staff also confirmed the observation that all the children took the successful and rapid completion of the puzzle quite seriously. This seems to have been a fortuitous side-effect of somehow being a special adult in the nursery, whereby the end result was an elapsed time measure which genuinely seemed to reflect each child's best effort on the puzzle.

3.4. Results of Pilot Study

Before the data collection had been completed, it became clear that the children were finding the main puzzle excessively difficult. Once under way however, experimental sessions were continued for the full sample of children, the majority of whom were in fact able to complete the puzzle. However, their solving times were considerably longer than they had been for several other comparable puzzle candidates. From the total sample of children, four of the children had found the puzzle too difficult to complete without a significant amount of help from the experimenter. In the statistical analysis these children were not included.

Table 3.1 summarises the main findings for the Pilot Study. An initial analysis of the children's performance revealed no gender differences in elapsed time (on task). The boys' mean solving time was 7.18 minutes, (sd=4.05). The girls' mean solving time

was 7.58 minutes, ($sd=3.16$). There was greater variation in the boys' times, though no overall performance differences $t=.278$, $p=.78$. Although there was a general trend for longer solving times among the younger (year 1 of nursery) children, this difference did not reach significance; nor was there any appreciable interaction between age and gender.

The pilot study results for the children's total help-eliciting utterances were ambiguous. An examination of simple raw frequency reveals that there were, on average, more HEUs were recorded for the girls (non-significant at .05 level). However there were considerable differences in variance between the boys and the girls, $sd=2.5$ and 3.0 respectively; and data for both were non-normally distributed. Their median scores, a more informative measure, were equal.

Table 3.1 Summary of results for Pilot Study

Task Performance*		Males	Females	t-value	p-values
On-task solving time (minutes)	Mean	7.18 min.	7.58 min.	0.28	0.78
	sd	3.16	4.05		
	Range	2.62-12.07	2.12-11.00		
Verbal & Non-Verbal**		Males	Females	U-values	p-values
Help-eliciting utterances (as proportion of total utterances)	Median	0.04	0.03	46.00	0.34
	Range	0.0-.38	0.0-.06		
Hedges and tags (per minute)	Median	0.20	0.20	61.00	0.52
	Range	0.0-.35	0.0-3.97		
Eye-contact (per minute)	Median	0.50	1.30	25.00	0.01
	Range	0.0-1.78	.21-5.63		
Collaborative expressions (per minute)	Median	0.00	0.02	25.00	0.01
	Range	0.0-.03	.003-.09		

* Comparison using unrelated t-test

** Comparisons of frequency data using Mann-Whitney U-tests

An examination of HEUs, controlling for total number of utterances and solving time also revealed no conclusive differences using a Mann-Whitney U-test. Male and female median scores were very similar, with boys in fact, very slightly higher (.04 and .03 respectively). This is to say that although on average there were more help-

eliciting utterances among the girls when using raw data, this remained non-significant especially when controlling for individual differences in solving time and verbosity.

Hedging statements and tag questions were surprisingly infrequent, and therefore the data were collapsed to form one measure. However, as with HEU comparison, when these types of utterances were considered as a frequency per minute, the gender difference disappeared (both median scores=.20). Use of hedges and tags also revealed large differences in within-group variance. Among the girls the frequency ranged from 0 to 3.97 per minute, compared to a male range of 0 to .35.

The measure of the children's collaborative expressions did reveal significant gender differences, although as a type of utterance, these occurred very infrequently among both girls and boys. The median frequency per minute among the girls was .02 compared with the boys' median score which was 0.0. These very low frequencies did, however, yield a significant difference using a Mann-Whitney U test ($U=25$, $p\leq .01$).

The measure of eye-contact frequency yielded statistically significant gender differences ($U=24$, $p\leq .01$). The females made eye-contact more often than the boys with a median per minute score of 1.3 and .5 respectively.

3.5 Comments and Conclusion on Pilot Study

As described above, the results of this pilot work proved to be empirically inconclusive. On one level (simple raw frequency data) there were trends in the expected directions in regard to past work and related literature, but in more qualitative ways the pilot study proved to be quite informative.

The children's use of expressions which had a collaborative or cooperative meaning (e.g. Let's try this one here") are difficult to interpret. As a mode of communication they connote a desire to act jointly in an activity. Thus finding that girls use this more is consistent with the general characterisation of girls' social interaction as reflected in the literature. However, the scarcity among both girls and boys, make this an ambiguous finding. These will also be recorded in the main studies where greater numbers of children may reveal more conclusive patterns.

The girls' greater use of eye-contact during the solving session is suggestive of greater affiliative motivation. In accord with other research indicating greater female social motivation, eye-contact may simply be a non-verbal variation on that theme. Alternatively, it may have a connection with help-eliciting, serving as an intensifier of accompanying speech acts, and thus represent a different style of dealing with task difficulty. This particular sequential analysis--eye contacts occurring either simultaneously with an HEU or immediately following--was not undertaken for the Pilot Study data, but was added to the analyses for Study 1.

The Pilot Study findings overall, have served to raise a number of issues which can be fully explored in Study 1. One is the simple frequency of certain task-oriented behaviours. This research is mainly concerned with help-eliciting utterances, and a larger scale study, using proportional data will hopefully determine if any significant gender effects occur in the number of utterances of this type. Another related issue is the coding of verbal behaviours, particularly the demarcation of "help-eliciting" as distinct from "neutral" and "self-reliant" etc. This requires a full coding system (described in Chapter 5) which will provide categories that will be clear, mutually exclusive, and exhaustive.

Another central issue is the relationship that communication has with actual performance on the puzzle. A related set of questions would include the following: Is it possible, in practice, to uncover underlying motivations for help-eliciting utterances, either as overall trends, or for individual children? Are children at this early age capable or inclined to use help-eliciting in a non-literal, particularly social way; and does gender emerge as an important variable? These need to be fully explored using techniques that can empirically evaluate the connection, if any, between moment-to-moment progress in a problem-solving task, and help-eliciting utterances which in this specific context will have a clear perlocutionary effect upon an adult listener. In the pilot study, the puzzle solving period was treated as one rather large time sample, within which simple frequency counts were made. The above questions require a data collection system that records each distinct behaviour as an event in time, and allows for accurate measurements of when events begin and end, so that any distinct patterns of sequences can be observed.

A fourth central issue that emerged from the pilot study was the need to be able to classify the children's speech in terms of the focus, or *subject* of their utterances. This

became important because in a large-scale study, if gender differences emerged in the amount of help-eliciting, it would be of direct interest for the issue of needs and motivations (particularly social) to know whether some children were orienting their questions and comments towards the experimenter, themselves or the puzzle itself. Therefore the decision was made to incorporate this feature into the coding system (see Section 5.3.4).

One aim in the development of a full coding system was to provide an exhaustive set of mutually exclusive categories. The form of speech became an additional classification that was studied in order to provide a further degree of resolution in the overall picture of verbal behaviour. Following a review of the pilot study tapes it was decided that it would be of interest and importance to determine if differences occurred in the phrasing of "help-eliciting" utterances as either questions (interrogatives), statements (declaratives), or even commands (imperatives). Any differences observed could be relevant to the issue of overall differences in the way children verbally present themselves and possibly provide clues to underlying communicative motivations.

One very clear constraint in discussing trends, particularly any gender differences in the pilot study, and in the larger scale study which followed, is the degree to which the experimenter himself may effect the behaviour of the child in this setting. Variance attributable to the experimenter could exist in the form of unintentional systematic behaviour differences and of course, simply as a result of one's gender. This issue was addressed in Study 2 where two experimenters were used in the data collection, one male and one female.

In summary, the pilot work, whilst yielding non-significant results for verbal behaviours, except for use of collaborative expressions, did reveal some gender differences, the most distinctive being the level of variation within the two groups. Performance, as defined by the time taken to complete the puzzle did not differ between males and females; nor was either gender observed to have incurred greater "off-task" time during the experimental sessions. The pilot study did succeed in highlighting important research needs, both technically and in terms of the development of a full coding system. These were incorporated into the design of Studies 1 and 2 and are summarised overleaf.

- **An event-recording procedure**, with onset and offset times, was utilised, that made use of available video editing technology, particularly digital time display accurate to 1/25th of a second and frame-by-frame viewing.
- **A full coding system** was developed which reflected the additional research questions raised in the Pilot Study. Besides including classifications for help-eliciting utterances, the frequency of the children's other neutral or "self-reliant" speech was recorded. In addition, the grammatical subject of each speech act and the form of speech (declarative, interrogative and imperative) for each utterance was incorporated into the coding system. "Orientation" was an additional main category that was added to the full coding system. This term refers to the grammatical *subject* of each on-task utterance made by the children. Finally, the coding system also included the coding of hedges and tag questions, as sub-categories for all other utterances that were recorded on the coding sheets (as were collaborative expressions) by their first letters.
- **A videotape data coding sheet**, derived from the coding system was designed, with appropriate columns for all coded data. This was created in Microsoft Excel and allowed elapsed times for every coded event to be quickly and accurately calculated, as well as enabling summary statistics to be calculated.
- **A standard experimental protocol** for both the classroom behaviour of experimenter (for approaching the children to participate in the experiment) and the problem-solving session itself was established. This consisted of a standard set of behaviours to begin the session and to respond to the verbal and non-verbal behaviours of each child, including standardised refocusing techniques and stock responses for requests for help.

CHAPTER 4 METHODS FOR STUDIES 1 AND 2: CHILDREN'S COMMUNICATION IN A PROBLEM SOLVING CONTEXT

The central aims of Study 1 were to investigate children's use of spontaneous communication that occurs during on-task periods of problem-solving across age and gender and to investigate the relationship that task-related verbal and non-verbal behaviours, particularly help-eliciting utterances, have with actual performance. It was also a main objective to study closely certain sequences of verbal and non-verbal behaviour in order to discover any patterns of usage which may reveal underlying motivations, both social and task-related. As discussed in Section 2.11, the pragmatics literature (for example on the form and function of children's questions) suggests that children are capable of understanding and producing language which is both non-literal and socially facilitating. At the same time there is the widely supported belief that girls behave in more socially engaging ways. Both these areas of research, however, have taken place within very *social* and playful nursery and playgroup settings. A main concern underlying this project is to determine if such communicative behaviours can be identified within a clear *formal task* setting and occurs within the "speech genre" (Wertsch, 1991) of problem-solving. A second, equally important, question is whether traditional gender differences in social motivation occur in such a socially "rarefied" environment. One important research question is whether girls' and boys' help-eliciting may be functionally different, either in terms of their relative need or their interest in engaging the participation of an adult. This will be more exhaustively investigated here in Study 1, using a slightly easier puzzle-task than in the Pilot Study. The aim of the follow-up study (Study 2, Section 4.2) was to address the issue of gender-of-experimenter. On one level this was simply to determine if any results found in Study 1 may appear to be a function of simply being a male experimenter working with this age group. A broader aim, however, was to explore differences in both the children's behaviour elicited by each experimenter and stylistic differences that may appear when comparing the communicative behaviour of the two experimenters (in spite of standardised experimental procedures). An important contingent issue is adult interpretation of task-related communication, particularly help-eliciting, if significant gender differences do in fact emerge. This will be addressed in Chapter 8.

As discussed in Chapter 3, this would require very detailed analysis of the task-oriented communication by using an exhaustive set of categories and a system to record each event's duration and temporal relation to events around it. The level of observation used generates at least 3 sets of data for every utterance made by the child (verbal categorisation, elapsed time, and the recording of certain behaviour combinations in sequence). Thus, as a method of examination, it is labour intensive, and very time consuming. At the same time a key focus of the study is to identify and be able to describe possible gender and age differences in the use of help-eliciting communication, which as a set of behaviours may be extremely subtle and require relatively large numbers of subjects to allow important patterns to emerge. Indeed, one aspect of the Pilot Study data was the high level of individual differences. What was required was a methodology which could satisfy both research needs (great detail *and* large subject sample); and what evolved from the pilot work was a method of data collection which represents a hybrid of the traditional large-scale quantitative study and the more intensive, detailed qualitative study, characteristic of many behaviour microanalyses.

4.1 Subject recruitment, research approval, school and parent contact

There were 71 children who participated in Study 1, 33 girls and 38 boys. They were drawn from two nurseries, the University of Edinburgh Department of Psychology Nursery and a Lothian Regional Council nursery school. They ranged in age from 4;2 to 5;4 with a mean age of 4;3. The subjects were from a mix of socio-economic backgrounds, though primarily middle-class. None of the children who participated in the Pilot Study were included in Study 1 or Study 2.

Approval to conduct research in local education authority schools was sought from the Lothian Regional Council's Research Evaluation Committee. Once permission had been given, the head teacher of a local Edinburgh school was approached for approval to conduct the research. Children attended the nursery for two years, with the age groups divided into morning and afternoon sessions. Within each session there was a total of four classes each of approximately 18 children.

Before any child participated in the study, final permission was sought in writing from their parent/s or caregiver. They were provided with a description of the project as a study of children's communication styles in a problem-solving setting. This letter

(Appendix-Study 1) described in brief the experimental procedure to be used, including the free choice given to each child to participate or not and the fact that general trends were being studied and not individual behaviour or ability. Permission was sought firstly, to have each child videotaped in the problem-solving sessions and secondly for their videotape to be used in later stages of the research, involving adult interpretation of children's communication style (Chapter 8). In filling in the permission forms, parents and caregivers were able to agree or decline to have their child participate in either one or both parts of the study.

4.2 Methods for Study 1

4.2.1 Problem-Solving Task

The puzzle used in the Pilot Study (Fruit Truck) proved to be solvable by most children in this pre-school sample and thus fulfilled the aim to provide a challenging, yet manageable task. However, there was a very clear, albeit subjective, impression that most of the children struggled a bit to complete the puzzle unaided. Analysis of the data yielded generally greater variation among the females, with the notable exception of their HEU scores. No significant differences in overall frequency emerged. However the earlier MA work had indicated significantly greater female use of help-eliciting utterances. Such a discrepancy seems to imply two possible explanations. One is that the results of earlier MA work were spurious, perhaps an artefact of the methodology or some observer bias; the other possibility is that even within a fairly narrow range, puzzle difficulty will differentially affect the help-eliciting behaviours of males and females, implying that when the problem-solving becomes more difficult, either the boys begin using relatively more HEUs or the girls begin using less or perhaps a combination, with the result that a gender difference becomes masked or extinguished when the task becomes exceedingly difficult.

Conventional wisdom holds that for one group to use fewer HEUs in the face of increasing difficulty is unlikely, since help-eliciting, if it is what it seems to be, could only increase as a function of the difficulty encountered. However, revisiting the earliest data and comparing it with the Pilot Study data, reveals that on the basis of elapsed time, the children in the earlier study (University of St. Andrews, Psychology Department Nursery; $n=22$, 10 girls, 12 boys) appeared to find their puzzle easier than those of the Pilot Study. The mean elapsed times between the two puzzles

differed by almost three minutes (4.47 minutes, $sd=2.62$ vs. 7.40 minutes, $sd=3.52$, respectively; $p \leq .001$). Though representing two roughly equivalent groups of children, the results of these two studies should not be considered as a means of testing the effects of puzzle-difficulty upon HEU use. This is mainly because of several methodology changes and improvements in Pilot Study.

In selecting a second puzzle for Study 1, considerably more time was spent experimenting with various types of puzzles and levels of difficulty. In addition, an attempt was made to identify a puzzle-task which would be as neutral as possible in terms of sex-typing. One might argue that a picture of a dump-truck unloading fruit might have been slightly biased in favour of male appeal, though no overt difference emerged in the Pilot Study.

The puzzle selected was a conventional wooden jigsaw puzzle, depicting a picture of a red, double-decker bus (Figure 4.1) with a number of people aboard (adults and children of both genders). It was painted in three colours (yellow, red and black). The picture was of simple design and consisted of twelve pieces. It was very similar to the fruit truck puzzle of the Pilot Study in its level of detail and number of pieces. However, in several trial runs with nursery children, the elapsed solving times were more in line with those found in the MA study. Initial observation indicated that this task still appeared quite challenging for the children, but in general did not create the impression of a struggle, which had characterised the Pilot Study solving sessions. For the warm-up puzzle used in the Pilot Study was also used in Studies 1 and 2.

4.2.2 Audio and video recording and editing: equipment and procedure

As in the Pilot Study, the experimental problem-solving sessions were videotaped using a NV-MS Panasonic VHS Video Camcorder. The camera/tripod arrangement used in the pilot study was retained, with the camera located approximately eight feet from the table. When possible, the assembly was placed behind furniture so as to minimise its presence as a distraction for the child. In practice, the equipment rarely caused either interest or concern among the children. The range (8-10 feet) and angle (approximately 15° from horizontal) allowed for the best combination of a clear view of the puzzle and a clear view of the child's face, whilst keeping the experimenter in the picture (see Figure 3.3). An addition to the recording procedure was the use of a

Sony ECM 16-T miniature tie-clip microphone which was clipped to each child's shirt or jumper collar. This dramatically improved audio taping clarity.

Once the child was comfortably settled in the chair, the experimenter started recording and presented the warm up puzzle. Recording continued uninterrupted through the completion of both puzzles.

Master tapes were copied to new ones in a Panasonic VHS Edit Suite, which consisted of the AG-6200 Source Machine, a NV-8500 Edit Machine, a NV-A500 Edit Controller and a GYYR Video Timer Model G-77. Copies of each tape indicated digitally the time in hours, minutes, seconds and hundredths of seconds (though it advanced in 1/25th second increments, equalling one video picture frame) for the purpose of later frame-by-frame analysis. This degree of accuracy was mainly necessary for coding of sequentially derived data, such as the onset times and offset times of eye-contacts (durations of which were commonly less than one second) and for exact recording of transitions between child behaviours and experimenter responses.

Figure 4.1 Puzzle for experimental trials, Studies 1 and 2.



4.2.3. Experimental Procedure

The controls used in the Pilot Study to avoid confounding effects that might occur simply as a result of being a new person in the nursery classroom were also employed in Study 1. Before any experimental trials took place, at least three weeks of visiting time was spent in both the departmental nursery and the local council nursery. Approximately three times per week for 2-3 hours, the experimenter spent time with the children individually, learning their names, those of their siblings, their favourite activities, etc. As in the Pilot Study, data collection did not begin until the experimenter was thoroughly familiar to all the children.

For Study 1, a specific routine was established for approaching a child to participate in the puzzle-solving task. This was to ask, "Would you like to come solve a jigsaw puzzle with me?" Most children, having already interacted in numerous activities with the experimenter, responded positively and immediately. However, when there was indecision for any reason, they were allowed to think about it and a few minutes later the question was reiterated. If there was still indecision or any reluctance, the child was told that was fine and that perhaps they might want to try some other time. Any child who seemed to have agreed to participate reluctantly or under pressure, was not taken into the experimental setting. If, on the second invitation to participate, the child agreed, the experimenter confirmed their wishes by asking, in another way, if that was indeed what the child would like to do.

Once in the experimental setting, the child was allowed to get comfortably seated at a nursery-sized table (approximately 14" high). As in the Pilot Study, the experimenter was seated beside the children, generally to their left. S/he was then presented with the relatively easy warm-up puzzle to solve. Previous experience during the Pilot Study revealed this first puzzle to be an important opportunity for some initial interaction which helped to minimise the effects of individual differences in how comfortable the children felt in this situation. As discussed in Chapter 3, the warm-up puzzle also provided a salient "success" for each child, thus helping to control for individual differences in momentary mood and confidence.

After completing the warm-up puzzle, each child was asked if s/he would like to try another puzzle. Again, if any apprehension was observed, s/he was allowed to quit

and was returned to the classroom. After completing the warm-up puzzle, the second puzzle was then presented.

As in the Pilot Study, before beginning the second puzzle, each child was asked to look carefully at the picture and to describe what s/he saw and each major feature of the puzzle was pointed out and discussed with the child. This included how many people were depicted, pointing out the driver, the wheels, staircase and the two seating levels. This made certain that every child understood all aspects of the picture and that no child had any particular advantage due to awareness of the picture.

4.2.4 Experimenter responses to children's verbal and non-verbal behaviours

During the solving of the puzzles, a pre-established set of behaviours was used in order to better standardise the experimenters' behaviours, whilst keeping the interaction as naturalistic as possible. This included responses to questions posed by the child, both on and off-task. If a child asked a question unrelated to the solving of the puzzle, the experimenter provided a spontaneous, direct answer. As in the pilot trials, the children occasionally raised topics that were unrelated to the puzzle, ranging from stories about their families and holidays, to what they had eaten for breakfast. When this occurred, they were allowed to elaborate for a few moments and then were re-directed to solving the puzzle. If they asked questions about the solving of the puzzle, these were answered in a non-committal way which did not provide either substantive information or direct assistance. These responses to such questions were intended not to sound cold or uninvolved, but simply to be without instrumental value in solving the puzzle. Thus for example, if a child asked "where does this piece go?", the response would be one of several stock answers such as "hmm, I'm not sure." Similarly, if the question was a direct request for help (e.g. "will you do this piece for me?") the experimenter would respond by claiming not to know where it belonged and would ask the child to put the piece where s/he thought it might fit. Fortunately, all of the children were satisfied with such answers and carried on solving the puzzle.

The experimenter behaviours were intended to be as normal as possible without providing help or serving to shape the child's spontaneous comments or questions. A standardisation of responses to their solving progress was also used which still allowed as naturalistic an interaction as possible. Incorrectly placed pieces were not commented upon; however, when a child placed a piece in the correct place, one of

several possible standard affirmative responses were used, for example: "good, that looks right" or "well done" etc. This procedure was employed because total detachment by the experimenter was quickly sensed by the children in pilot work. Failing to provide any feedback on progress caused the children to become confused and ultimately discouraged or disgruntled with the solving session.

During the course of the puzzle, if a child became distracted in a more than momentary way, the experimenter would redirect his/her attention to the puzzle by asking which piece could go in next. This nearly always succeeded in re-establishing progress on the puzzle. As described in Section 3.4, the puzzle-solving sessions seemed to create a very focused state in nearly all the children and re-focusing their attention on the puzzle was rarely necessary. Strategies for re-focusing their attention were occasionally used when a child became "stuck" by fixating on one piece. These situations could be described as being impasses which did not reflect the child's ability or performance overall. And when this infrequently occurred the experimenter would redirect the child's attention to another piece without instrumentally assisting him or her.

In the experimental sessions of Study 1, the second puzzle usually took between 3 and 5 minutes, after which each child was complimented on his or her good work, thanked and returned to the classroom.

4.3 Study 2: gender-of-experimenter as a mediating variable in children's task-related communication

In Study 1, communicative behaviours were analysed with a view to making meaningful inferences about overall trends in verbal style (in the structure, orientation and self-presentational tone). The study was specifically intended to scrutinise task-oriented language and assess the relationship that verbal behaviour had with actual performance. In doing this, the study had the implicit aim of looking for language use which may not have a straight-forward relationship with problem-solving performance and therefore may serve other purposes, including social facilitation.

A great deal of research has looked at the gender-specific behaviour of children, both from a developmental perspective and from a social interactional one. Few psychologists, however, have discussed or formally examined what effect the gender

of the adult in a dyad may have upon the child's *spontaneous* communicative behaviour. However, the findings that are available have implications which have a direct bearing upon the design of this study. Maccoby and Jacklin's (1974) review of sex differences is still a very useful collection of findings relating to both cognitive aptitudes and social behaviours. The published findings at that time were demonstrating early (nursery-aged) same-sex affiliation and same-sex modelling along with the associated toy preferences which increased continually through childhood and early adolescence. Other researchers (e.g. Fagot, 1984; Maccoby, 1990) have examined the concept of gender identity, same sex affiliation and imitative modelling. This research, in a very broad sense, is relevant to the "effects of adult gender" discussion, but only because of the assertion that gender roles/behaviours develop as a function of adult models and norms. Because this body of research is primarily found in the context of the *social learning theory versus innate differences* debate, the findings are generally organised to speak to that issue. Moreover, these examples do not usually relate to specific, short-term episodes of verbal behaviour, but rather to the long term developmental aspects of gender roles and language use.

Research specifically examining spontaneous communicative behaviours as a function of the gender of the adult or social partner, is sparse and rarely relates to young children. Women, for example, in a study of written discourse (peer reviews of academic papers) were observed to structure their letters (in terms of "compliments," "personal referencing," etc.) as a function of the gender of their addressee (Johnson and Roen, 1992). Nelson-Le Gall, De Cooke and Jones (1989) reviewed the literature on gender and help-seeking and help-giving among school children. They found an overall trend in the studies reviewed (e.g. Northman, 1978) for children of both sexes to say they prefer to approach a female for help. Reasons for this, they assert, are related to the predominance of women as the primary caregivers and teachers for young children. Thus, "teachers, for many children this age, are seen as prototypical helpers, as are mothers." (p. 457) However, in actual practice children's requests for help remained greatest, simply across same-sex pairs (Nelson-Le Gall and Glor-Scheib, 1985).

Whilst providing insight into possible childhood preferences for gender of helper, such studies unfortunately do not allow us to make predictions about what verbal behaviours (relating to help-seeking) may emerge once in a dyadic problem-solving context with an adult of a particular gender. There is a vast body of literature

pertaining to early socialisation into sex-appropriate behaviours. There are findings (discussed in Section 2.5.2) for example, that preschool children as young as 2-3 are observed to use language in sex-typed ways, particularly with regard to help-seeking (Kuhn, Nash and Brucken, 1978); and that boys receive negative reinforcement for help-seeking (Fagot, 1977). Although these studies do not specifically examine adult or peer gender as a variable in dyadic contexts, they would lead one to predict greater "gender stereotypical" behaviour in same-sex adult-child pairs (e.g. boys displaying more overt verbal confidence in the presence of a male adult).

4.3.1 Aims of study

In Study 1, the corpus of data was collected by the author, a male. While the experimental procedure was designed to minimise all the inherently possible effects that might be related to being alone with a relatively unfamiliar adult and being outside the classroom, the gender-of-experimenter was clearly an uncontrolled variable. Therefore, an additional study was designed to explore the gender-of-experimenter variable, to determine what mediating effects it may have upon the child's spontaneous communication. The aim was to look for any intra-child differences that may emerge as a function of experimenter gender. The design of Study 2, therefore, was intended to allow comparisons between data sets generated by each experimenter and to determine which behaviours of the children, if any, differ as a function of the gender of the experimenter. This was undertaken, however, with the knowledge that if gender-of-experimenter effects were to emerge, they may do so in a way which is specifically a function of intra-child differences in attitudes about male and female teachers, adult gender roles, as well as personal and individual preferences and anxieties, etc.

4.3.2 Procedures for school visits and experimental sessions

A female colleague was recruited to participate in this study as an additional experimenter and a considerable time was spent familiarising herself with the methods of the study. Because the intent of the study was to isolate gender-of-experimenter as a factor, training was focused on developing a high level of consistency in the behaviour of the two experimenters. This included experimental and classroom contact time, as discussed in Chapter 3. Before beginning the experimental trials the female experimenter spent the same amount of time in the classroom as the

experimenter in Study 1, becoming familiar with each child on a first name basis. This amounted to approximately three 2 1/2 hour days per week for three weeks.

Training sessions were conducted with the female experimenter, using Departmental children who did not participate in the study. These allowed her to become familiar with the entire process and especially to become consistent in the use of the formalised experimenter behaviours relating to the handling of outside distractions, lapses in attention and on-task and off-task questions, etc. (see Section 4.2.3).

As in Study 1, the verbal routine for approaching a child to participate in the puzzle-solving task was to ask if they would like to come with the experimenter to solve a jigsaw puzzle. As before, most children responded positively and immediately. Overall the procedures for approaching children and asking them to participate were consistent with Study 1. Care was taken to ensure that the children were participating with enthusiasm and without any reluctance or apprehension.

Once in the task setting, the procedure followed the exact same format as Study 1. The child was invited to do the first warm-up puzzle and this was followed by presentation of the experimental puzzle (one of two, described in Section 4.3.3). Each child was then asked to describe in detail all the various features and people pictured. The pieces were then tipped out and the solving commenced. Each child's puzzle-solving session was videotaped and the data analysed across the same categories of verbal and non-verbal behaviour as was done in Study 1.

4.3.3 Subjects and problem-solving tasks for Study 2

New subjects for Study 2 were also recruited from the Departmental nursery and the same local nursery school as in Study 1. The experimental sessions were conducted at the same time of year as in Study 1, to ensure a sample of children drawn from approximately the same age-range as the first study. They had a mean age of 3;10 and ranged from 3;0 to 5;2 and consisted of 17 girls and 16 boys.

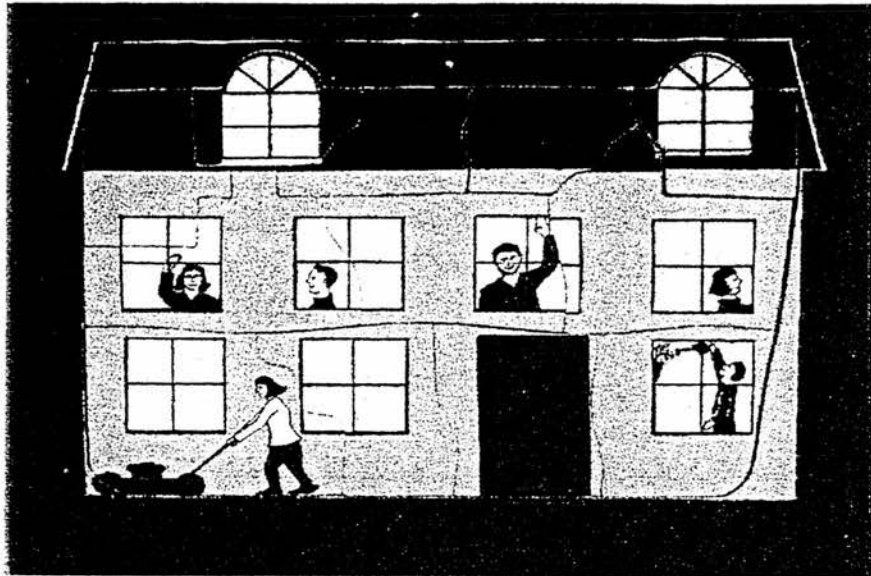
Each child in the study participated in a puzzle-solving task with each of the experimenters, thus generating two sets of data for comparison across the categories of communicative behaviour. This necessitated two puzzle-tasks which needed to be matched for difficulty. In the pilot work for this study a series of jigsaw puzzles was

tested in terms of general appeal and difficulty, using the original bus puzzle of Study 1 as a benchmark. Difficulties arose in this trial and error process. Whilst several puzzles could be found that were approximately matched for difficulty (based on overall elapsed times in repeated-measures trials) an excessive level of intra-child variation often occurred, that seemed attributable to several factors: differing pictorial complexity, colour scheme and, in a particularly unpredictable way, simple likeability. This problem was resolved by purchasing two identical bus puzzles and having one repainted in the up-side-down position with a new picture. What this achieved was to have two puzzles with identical complexity of shapes, though very unlikely to be recognised by the children as the same puzzles, due to the new picture being painted on top of the inverted surface of the bus puzzle (see Figures 4.1 and 4.2). This new picture consisted of a simple house which was matched with the bus puzzle for the approximate number of people depicted, the number of colours used and the overall linear complexity. In the original bus puzzle, there were some pieces whose shapes were defined by actual features in the picture, in this case two wheels. These became, quite consistently, the pieces which children first recognised and correctly placed. In the house puzzle this effect was matched by using those same pieces (now inverted) to form two distinct round-topped windows, thus maintaining the same number of distinctive feature shapes.

Using these two puzzles allowed a repeated measures design which overcame inevitable practice effects that would have occurred had the children solved one puzzle on two separate occasions. However, they both were made of identical pieces and thus remained functionally very similar. Because the house puzzle was inverted relative to the bus puzzle, none of the children recognised the puzzle pieces during their second session.

In addition, the experimenter-child pairs and puzzle presentations were counter-balanced, to control for order effects. Thus for the sample of children, half solved a puzzle first with the female experimenter and half solved a puzzle first with the male experimenter. Of the children solving a puzzle first with the female experimenter, half were presented with the bus puzzle and half with the house puzzle. The same arrangement was used for the male experimenter.

Figure 4.2 Second puzzle for experimental trials, Study 2 (with outline of pieces highlighted to show inverted arrangement relative to bus puzzle).



4.3.4 Analysis of videotape data for Study 2

The method for viewing the videotapes, identifying and coding the verbal and non-verbal behaviours was identical to Study 1. Master tapes were copied onto new tapes with the addition of digital time display, showing hours, minutes, seconds and hundredths of seconds. Using the same video equipment, they were viewed and the behaviours coded and recorded onto standard data sheets as discrete events with their onset times and offset times. The system for coding and recording behaviours are discussed in full in Chapters 5 and 6.

4.3.5 Analysis of experimenter behaviours in Study 2

Another independent set of analyses for Study 2 was the examination of the experimenters' verbal and non-verbal behaviours during the solving time for each child. As described in Section 4.2.4 a standardised set of responses and initiatives was established for interaction with the children during their solving of the puzzle. This was to introduce a level of control whereby the effect of the gender of the experimenters, if any, could be identified. It was intended as a naturalistic set of stock responses and refocusing techniques. However, the desire for an ecologically meaningful experimental environment also must carry the acceptance of some degree of normal but "uncontrolled" and unpredictable variation in human interaction. The

design, after all, was intended to create standardisation, but not to make the female experimenter behave *as though she were* the male experimenter or, moreover, in a prototypically masculine way. It was of great interest to this research to find out what kind of verbal variation, in spite of an experimental protocol, may have occurred between the two experimenters. Primarily, however, this further analysis was intended to determine if any systematic differences could be observed in the way the two experimenters interacted with the boys and girls. These differences, if any, might include the frequency of certain responses to the children's questions, requests and comments, as well as the tone of what was said. Specifically, this could include the frequency of positive or negative reinforcements given to the children, such as compliments, affirmations, negative comments and disaffirmations. The intention was to explore the patterns of responses that may have subtly shaped the children's communication, especially that which might be interpreted as "help-seeking." One might hypothesise, for example, inadvertently increasing helping behaviour towards those children who appeared to elicit help more, thereby reinforcing such verbal behaviours.

The formal analysis of the experimenters' verbal and non-verbal behaviour was also intended to identify any systematic communicative differences such as helpful observations and refocusing techniques (between experimenters overall and across gender of children) which might have influenced their performance on the puzzle. In order to address these issues, a full coding system was required which would facilitate statistical analysis of any experimenter speech acts, whether they be spontaneous utterances or responses to the children's questions or statements. This coding system is described in full in Section 5.7. Below are the key questions this further analysis was intended to address, in terms of the factors of gender-of-experimenter, gender-of-child and child's communicative style (and possible interactions).

1. Did the two experimenters interact with the children in any significant and systematically different way with regard to their responses to the children's questions and progress on the puzzle?
2. Were there any patterns of verbal behaviour used by the two experimenters which might have differentially reinforced *either* a "dependent" or "independent" style among the children?

In the experimental design of Study 2, particularly with respect to the way the two experimenters were to interact with the children, efforts were intended to *minimise* any systematic difference. This resulted in a study of their behaviour which had many built-in forgone conclusions regarding the aspects described above, i.e. a series of no-difference findings. In addressing the first question above, the coding system contained categories to classify different experimenter responses to the children's "help-eliciting" questions and comments, as well as momentary impasses and lapses in attention, which might be described as a continuum from totally neutral to patently helpful. They were headed "refocusing" utterances and reflected the broad sense of the term, such that it described simple re-establishment of attention to the puzzle, on one end of the spectrum and resumption through help on the other (though great efforts were made *not* to help the children). The intention was to determine if the two experimenters may have developed patterns of greater encouragement or helpful comments for some children. This might have been across gender or across levels of performance or indeed levels of the children's help-eliciting.

The second question, above, is more speculative and is addressed using the same data as the first. The issue is whether differences, if any, between experimenters and/or across gender of children might also be the sort that could reinforce styles of problem-solving communication that *appear* to reflect "dependence" or "independence." This however, remains rather speculative, since it cannot be known whether systematic avoidance of "helping" communication *increases* or *decreases* a child's "help-eliciting." Conversely, do helpful responses to requests satisfy the immediate difficulty (if there is one at all) and thus reduce later requests for help or the opposite by positively reinforcing the behaviour?

The larger question of everyday adult responses to children in problem-solving situations is different and more complex than the central ones being addressed in this follow-up study. Study 2, besides serving as a partial replication, was designed to examine the effects of the mere presence of one gender versus the other in a formal problem task, rather than attempt to study the effects of "masculine" and "feminine" styles of interaction in their full and spontaneous expression. This would require an entirely different independent study using numerous adult-child dyads, interacting in totally unscripted, spontaneous ways. This further type of study was not within the scope of this project.

CHAPTER 5 CODING SYSTEM FOR STUDIES 1 AND 2

5.1 Aims and scope of Study 1 coding system

The coding system developed for this research reflects the specific data analysis needs which emerged in the Pilot Study. It also fundamentally reflects the research questions that were raised as part of the examination of literature concerning gender differences in communicative style and language development, particularly developmental pragmatics.

The coding system was primarily designed as a tool for analysing children's *verbal* behaviour. The weighting placed on verbal behaviour is apparent by its depth and complexity relative to non-verbal behaviour in this particular setting. The treatment of non-verbal behaviour in this classification system is clearly not a reflection of the actual pervasive and essential role in normal human communication. Any research claiming to examine communication must take this into account when categorising speech acts. In this research, the study of non-verbal behaviour is certainly not exhaustive, but rather has been undertaken specifically to provide essential measures of task-related physical movement and eye-contact that will help better frame and define the verbal behaviour that occurs. The non-verbal categorisations are mainly concerned with physical manipulation of the puzzle itself and in this study are carefully recorded in order to provide a framework for each child's verbal communication that was occurring as a stream of parallel information.

As discussed in Chapters 1 and 2, the classification system was organised around the principles of children's speech acts as units of meaning. Thus rather than coding the semantic qualities of words and even strings of words, what became the focus of analysis was the speech act as defined by the work of Austin (1962), Searle (1969, 1971) and others. This was used as the unit of measure for the description of verbal behaviour as it is commonly conceived (e.g. Ochs, 1979; Bloom, 1978).

The role of context (also discussed in Chapter 2) in the interpretation of speech acts, has been a fundamental preoccupation of linguists for the last three decades and is an issue which has existed since the beginnings of philosophical study (Coulter, 1994). However, one might argue that there are qualitative differences between interpreting

"context" in developing a taxonomy of speech acts in a specific setting on the one hand and trying to contextualise one or more complex social events, such as cross-cultural religious rites on the other. Coulter makes this point in defence of contextualising speech acts. He asserts that,

a tendency to *mystify* contextualisation has become a feature of the intellectual scene in various disciplines, largely inspired by the deconstructionist, post-structuralist and related forms of *logophobia* . . . This brief treatment of the issue of contextualisation is designed to arrest the tendency on the part of many theoreticians to consign the concept of 'context' to an interpretive 'free space' of infinite plasticity and to insist, instead, that 'context' is an ordinary word with a decipherable grammar whose parameters preclude its positioning within an open, hermeneutic vortex (p.690).

Within intersubjectivity research this has been an important issue, because a great deal of interpretive work must be done when one of the interlocutors may be pre-verbal. The stance taken relies on a pragmatic interpretation and use of context, both in the linguistic/communication sense and in terms of managing to get on with very interesting research. This case is made by Trevarthen and Marwick (1982) and as put by Dore and McDermott (1982),

. . . linguistic analysis can specify potential meanings and functions, but cannot indicate actual interpretations to which conversationalists are oriented. Linguistic analysis alone renders an account that is propositionally ambiguous, functionally equivocal, and interactionally indeterminate. In order to account for how talk becomes determinant for conversationalists, a pragmatically-based interactional approach is offered (p. 354).

Developing a coding system for this research required these considerations, though in a way that is one step removed from direct contextualised interpretation. As discussed in Chapter 1, a central aim in this research is to study the *perlocutionary intent* and the *perlocutionary force* of preschool children's task-related utterances. Determining the former, as many researchers have remarked, is particularly difficult, firstly because pragmatic skills can be masked by grammatical, syntactic and semantic immaturity and secondly, communicative motivations may be difficult to determine because of uncertainties to do with interactional style, social and problem-solving competence. The focus of the coding system and subsequent analysis was on the latter, the *perlocutionary force* of their utterances, defined as the effect that could be expected to occur in the mind of a naive adult observer in similar setting.

5.2 Coding system used for analysing non-verbal behaviours

5.2.1 "Searches"

The essence of a jigsaw puzzle is its existence as a collection of separate pieces, which must be reassembled to create a unified picture. Each piece then represents a sub-problem that can have a solution. For the purposes of classifying each child's manipulation of the puzzle, the handling of each piece was defined as a "search," which could have a successful outcome as a correct placement, an unsuccessful outcome as an incorrect placement or an undefined outcome if the piece is put down in order to try another. In the analysis of the videotapes, searches are delineated by their exact onset times and offset times. Search onset times were standardised as being the moment the child lifts up a puzzle-piece and subsequently attempts to place it in the puzzle frame. The occasions when the child would momentarily lift up a piece, only to drop it again without making contact with the puzzle frame were not included as "searches." The end of an individual search was defined as the exact moment the child placed the piece in the correct place within the frame or returned it to the table or placed it in an incorrect place in the puzzle-frame.

5.2.2 Correct and incorrect placement of puzzle-pieces

These classifications are clearly self-evident. However, for the purposes of accuracy in later sequential analyses using verbal behaviour data and for the purposes of inter-observer reliability testing, it was necessary to establish a standard operational definition. Correct placement occurred when a puzzle-piece was placed in the puzzle-frame, in its exact place within the picture. Juxtaposing two or more pieces as they were meant to fit together, but in the wrong place, was not counted as a "correct placement."

An "incorrect placement" was defined as a puzzle-piece placed in the puzzle-frame where it did not fit in the picture. It was only coded as such if it was placed and another piece picked up (i.e. it was followed by a new search onset). Occasions when the child placed the puzzle-piece in the wrong place, but then removed it without any intervening searches, were not coded as incorrect placements.

5.2.3 Eye-contacts

Eye contacts were recorded as an essential addition to verbal communication. In the Pilot Study these were coded as a simple frequency measure. However, in the examination of pilot videotapes, these were seen to occur with great variation in duration. Initial observations also gave the impression that they may have occurred with some relation to "help-eliciting" utterances. In Studies 1 and 2, therefore, they have been recorded as events with exact onset and offset times, in order to allow analysis regarding duration differences or identifiable patterns of sequences with other behaviours.

From the videotapes the focus of a child's gaze was readily apparent. Eye-contacts were defined as any period of time when the child's eyes were clearly focused on the experimenter's eyes. Onset and offset times were exactly (within 4 hundredths of seconds) recorded to allow elapsed times to be computed.

5.3 Coding system used for analysing verbal behaviours

Verbal behaviours recorded on videotape during the puzzle-solving sessions were categorised using a coding system that was developed for the purpose of analysing the children's task-oriented language. The rationale for this (as elaborated in Chapter 4) was that a key interest was in determining if any non-literal, *task-related* language could be detected, which may serve a social purpose. Thus only speech acts which occurred during "on-task" time were analysed. Utterances which were excluded from the coding system were those which were unclear or unintelligible. This included any non-verbal noises such as squeals, chirps, grunts, sighs or laughter, as well as portions of utterances that were too incomplete to *reliably* derive any meaning. As is typically done in verbal coding, self-repetitions in rapid succession were not included as independent speech acts.

The coding system for verbal behaviour contains three main categories which reflect the primary objectives of the Study 1:

- To identify any patterns in the *orientation* of the children's speech (to whom or what their utterances refer)
- To identify any patterns in the grammatical structure used (forms of speech)
- To identify any patterns in self-presentation, either "neutral/self-reliant" or "help-eliciting".

One can see from a schematic representation of the coding system for verbal behaviour (Figure 5.1) that it forms a system of nested categories, in which all utterances are coded for "self-presentation" as being either "help-eliciting" or "neutral/self-reliant." Depending upon the grammatical structure the utterances then fall into one of the three "orientation" categories, which in turn are sub-divided into the three forms of speech (imperative, interrogative and declarative).

Whereas "orientation" and form of speech represent relatively clear-cut structural divisions, "self-presentation" requires the most careful and thorough definitions.

5.3.1 "Help-eliciting" utterances

The term "help-eliciting" actually reflects the net perlocutionary effect that a speech act will have, even though it can be categorised in several other ways. Thus if someone were to hear a child say, "that piece is too difficult," it would be technically correct to class the utterance as a simple declarative sentence. However, as discussed in Chapter 2, there is wide consensus among linguists that the "meaning" of any utterance is understood to be contextually defined. In this study, this utterance would be categorised as a "help-eliciting" utterance. The classification given to this and other speech acts will, in part, be a function of the very specific and consistent context: a nursery aged child, working on a challenging problem-solving task, outwith the playful group or social setting.

Each speech act was categorised as an HEU by its conventional and contextualised meaning. HEUs could take several forms as described below.

Task knowledge or information	e.g.	"I don't know where this one goes" "I don't know how to do these" "I wonder where this goes"
Difficulty of puzzle	e.g.	"This is a difficult one" "There are too many pieces" "This won't fit anywhere"
Child's progress/ability	e.g.	"This is taking me a long time" "I'm not doing very well" "I put that in the wrong place" "I'm not good at this" "I'll need help on this one"
Direct requests for help or information	e.g.	"Where does this piece go?" "Will you do this one for me?" "You'll need to do this one" "Show me where this goes"

From the above examples it will be clear that the classification of "help-eliciting" is a categorisation which can occur across several types of utterances that may differ in their relative directness and intensity. However, these different types of utterances are all classed as HEUs because they all have in common the transmission of negative information about the child's own performance or ability. The use of the phrase "negative information" here is intended to mean, in a broad sense, anything which is not neutral or positive as a self-presentation.

To assess the ecological validity of such classifications, it is important to consider parallel "real-life" contexts within which one might find such utterances. In a typical nursery or playgroup setting one can often observe two, three and more children engaged in one activity, whether it be the building of a sand castle, using building blocks or solving a jigsaw puzzle. HEUs have the potential to be interpreted as

requests for help. However, hearing the utterance, "that piece is too difficult" within a context of several children playing with a puzzle, cannot be *presumed* to cause the listener to reflect upon the speaker's ability, performance or even their level of confidence. The context is a group, social setting where an evaluative interpretation of "performance," "ability" or "confidence" cannot be readily placed on one individual, because there is no way to know for sure *for whom* the piece is difficult.

Other contexts can be entirely different. A child playing alone at home in the care of a parent or a child in a dyadic context with a teacher, may be engaged in a problem-solving task or chore and might use such an utterance as "that piece is too difficult" In such settings, there is no *obvious* social element. The child, whether they have chosen or been told to work alone, logically can only be referring to themselves, as the person for whom it is too difficult. The listener in this context might be expected to reflect subjectively, if not on the child in general, at least on the meaning of the utterance within the framework of "performance," "ability" and "confidence." This subjective interpretation it seems, would not necessarily need a strictly dyadic setting. It seems intuitively plausible to find such perlocutionary effect in any context where children are expected to perform independently of each other, as is often the case during classroom exercises. The term "help-eliciting" utterance was specifically intended to reflect the perlocutionary effect that would be expected to occur among naive adult listeners in the context of a nursery aged child individually engaged in a problem-solving task. Thus whenever the term "help-eliciting" is mentioned with regard to the children's behaviour in this study, it will be within quotation marks, to reflect its status as a social/contextually defined behaviour.

5.3.2 Neutral/self-reliant utterances

The full coding system which was developed after a review of the Pilot Study findings, originally was to contain three separate "self-presentation" categories. This was to include a classification of "negative," "neutral" and "positive" speech acts. "Negative" speech acts is the category describing utterances which would be "help-eliciting" (as described above). "Neutral" speech acts included any utterance that could not be coded as "help-eliciting in any way, but was not overtly confident, for example, "this might go here." Lastly, "positive" speech acts included any utterance which clearly denoted overt confidence or boastfulness. However, during the initial data collection it was found that in fact, overtly confident or boastful expressions

were extremely rare, to the extent that any statistical analysis was not possible; moreover, drawing an arbitrary line between "neutral" and "positive" proved to be too problematic, in terms of both formal linguistic boundaries and more contextual pragmatic ones. Thus the categories "neutral utterance" and "positive utterance" were collapsed to form a single classification of "neutral/self-reliant utterance" (N/SRU) which better represented the vast bulk of speech acts which did not fall into the category of "help-eliciting." Such expressions would imply, to a naive observer, a state of "self-sufficiency" within the child.

In the puzzle-solving sessions N/SRUs usually occurred within the first three categories of constructions typified for HEUs earlier (*task knowledge/information, difficulty of puzzle and child's progress/ability*), but were opposite in meaning. These speech acts most commonly occurred as puzzle-directed statements about the shape of the pieces, their colour, spatial relationship, etc. Examples are given below:

Task knowledge or information	e.g.	"I see where this goes"
		"I'll fit the corners first"
		"That's one of the wheels"
		"That doesn't fit there"
Difficulty (ease) of puzzle	e.g.	"This is an easy puzzle"
		"This isn't too difficult"
Child's progress/ability	e.g.	"I'm almost done"
		"I got that piece in"
		"I'm good at jigsaws"
		"I'll do the top first"

5.3.3 Form of speech

This level of analysis allowed the most literal criteria for categorisation. Each and every speech act was coded by its form of speech, as either a statement (declarative), a question (interrogative) or as a command (imperative). Inclusion of this type of data provided a further technical framework with which to study any overall patterns of verbal behaviour, since meaning can be manipulated by syntax. One aim in the development of the full coding system was to provide an exhaustive set of mutually

exclusive categories. The form of speech became an important classification because it provides a far higher level of resolution in the overall picture of verbal behaviour. It is of interest and importance to be able to determine if different groups of children phrase their "help-eliciting" utterances as questions (interrogatives) or as statements (declaratives). Reasons behind any differences observed could be relevant to the issue of overall differences in their self-presentational style and could possibly provide clues to underlying communicative motivations.

5.3.4 Orientation of speech acts

A metric for analysing children's speech act orientation was used for two central purposes. One was to provide information that supplements the data pertaining to help-eliciting communication. Specifically, if patterns of help-eliciting behaviour exist, it is of interest to be able to analyse the form in which they occur, to determine if preschool gender differences can be observed in the way task-related utterances are couched, particularly if they are of a help-eliciting nature.

A second important function of this type of analysis relates to a more qualitative view of language. The language used by the children in this study was particularly task-oriented (due to the design of the setting). Because of this, any gender-specific patterns that occurred regarding about whom or what children's speech acts refer, may help confirm past findings regarding motivations behind help-eliciting utterances. Because the orientation categories include *self-directed* speech acts, along with *puzzle-directed* and *experimenter-directed*, an analysis of children's orientation of speech also allows one to study, in a limited context, differences in self-disclosure and self-presentation. There is a great deal of research which has attempted to identify and explain self-presentational style (see Section 2.6.2). Much of it indicates consistent gender differences in the willingness to express both positive and negative information about one's self. This part of the analysis will hopefully provide insight into the validity of these constructs among very young children.

The orientation of the children's utterances was categorised by the grammatical subject of each speech act. This method was chosen because it provided, with the least amount of ambiguity, the literal person or object to which a child's utterance referred. This reflects the fundamental intention of this portion of data collection: to determine if any patterns emerge in the type of information disclosed within each task-related

utterance, which in this context could either be about the puzzle itself, about the child or about the experimenter. The grammatical subject of a sentence is what it "is about," and was therefore decided to be the most useful way to study what is signified in the children's utterances. Whilst analysing *to whom* children are directing their utterances, would be of interest in the study of peer interactions, in a dyadic context this would always be the experimenter, if one uses a literal definition of "verbal communication." (However, see discussion on "private speech," Section 2.10.2).

Through earlier pilot work it was found that the vast majority of utterances in this problem-solving context occurred either as *puzzle-directed* or *self-directed*, when defined by the grammatical subject of the utterance. The category of *experimenter-directed* was retained, however, because of a small, yet consistent minority of utterances which directly referred to the experimenter. These almost exclusively occurred as either commands or requests to participate or assist in the solving of the puzzle and were distinctive in their directness as a "help-eliciting" behaviour. Below are examples of utterances as they would fall into each category. (see also figure 5.1)

Puzzle-Directed	"This piece goes in here"	(N/SRU)
	"This is a difficult one"	(HEU)
	"How does this one fit in?"	(HEU)
Self-Directed	"I don't know where this goes"	(HEU)
	"I'm going to put in the wheels"	(N/SRU)
	"I will try another one"	(N/SRU)
Experimenter-Directed	"Will you show me how this goes?"	(HEU)
	"You do the wheels"	(HEU)
	"Will you hand me that piece?"	(N/SRU)

5.4 Hedges and tag questions

As described in the previous chapter, linguists and sociolinguists (e.g. Lakoff, 1975, 1979; Coates, 1987, 1989) have identified and studied certain linguistic devices which when added to an independent clause, modify its intensity or its contextualised meaning. These are most often discussed as having a tempering or mediating effect

upon the illocutionary force of an utterance and are often associated with being polite or deferential.

Hedges (or "hedging statements") in particular, are commonly identified as single adverbs or very short clauses which serve to lower the force or intensity of a declarative sentence. For example, the force of the statement "that car is red." is diminished when used with a hedge, e.g. "perhaps that car is red." Other examples of hedges that might be attached to a declarative utterance include, "I think" and "maybe." In the analysis of the videotapes these have been recorded as possible variations of any declarative utterance. Both hedges and tag questions are characteristics of other speech acts (i.e. the expression "the car is red, I think" is a *type* of declarative utterance). Therefore they do not represent an independent category, but rather were integrated into the coding system as a further modification of verbal data and simply marked "H" or "T" on the coding sheets.

Tag questions can also be described as a linguistic device which generally tempers the force of a declarative utterance. These have been defined as very short questions which follow a statement and serve to question the truth of the statement to which they are attached, for example, "the bridge is two miles north, isn't it?"

5.5 Collaborative expressions

This classification was retained from the Pilot Study because of the need to provide further information about the qualitative nature of the children's verbal communication. This category specifically identified speech acts that by definition suggested the concept of collaboration or cooperation and were important for building an overall picture of social motivation.

Collaborative expressions, like hedges and tags, formed a sub-classification of verbal behaviour within the coding system. Initially it was to contain all the subdivisions created by its form of speech (declarative, interrogative, imperative) and by its mode of self-presentation (HEU or N/SRU). However, initial examination of the videotapes indicated that collaborative expressions formed a category of behaviour which occurred relatively infrequently, in any form. These sub-divisions were collapsed to leave a single category which would provide enough data to allow statistical analysis. In spite of their low overall frequency, the classification was

retained because they were particularly distinctive as a task-oriented utterance and were directly relevant to the issue of social motivation. Utterances were coded as *collaborative expressions* if they were formed using the words "we" or "us," including the contractions "we're" and "let's."

5.6 Procedure for recording of videotape data

Bakeman and Gottman (1986) describe two approaches to determining "units" for data collection: events or intervals. "Event-recording" pertains to discrete and *momentary occurrences* of any behaviour, whilst interval-recording refers to the measurement of *duration* for a target behaviour. The underlying rationale for event-recording is to collect primarily frequency data for behaviours which occur for brief moments. Interval recording in contrast is described as appropriate for longer duration "behaviour states" such as parallel play, REM sleep, etc. (Sackett, 1978 as cited by Bakeman and Gottman, 1986).

In Study 1, the data collection required the recording of *frequency* of verbal behaviours, whereby there was an interest in how many times any one behaviour occurred. This was the extent of the Pilot Study analysis. However, much of the Study 1 analysis focused on sequences of behaviours within each child, as well as experimenter-child sequences. This could be accomplished by simply recording the *order* with which events occurred; however, in the design of the study, the duration of some behaviours (e.g. puzzle piece searches and eye-contact) was required. The method chosen was to record all behaviours as events, with exact onset and offset times. This would provide duration data where needed and also preserved the precise frequency and sequence of child and experimenter behaviours.

A coding sheet was developed for the purposes of analysing the videotapes (Figure 5.2). This consisted of a spreadsheet created in Microsoft Excel 4.0, which contained columns for the Onset and Offset times, followed by the 19 speech act categories, the 4 non-verbal behaviour categories as well as the subject's personal details (name, gender, age, experimental group and date).

Generally, three viewing passes through each child's videotaped solving session were necessary in order to code and record accurately all verbal and non-verbal behaviours. Behaviours were coded and recorded from the second puzzle only and usually consisted of one viewing pass for the recording of verbal behaviours, one for the puzzle manipulation behaviours and one for eye-contact. Children who spoke very little could occasionally allow for one viewing pass for both verbal and non-verbal coding. The NV-8500 Edit Machine is equipped with a hand dial that allows the viewer to start, stop and modulate the video speed from one frame per second to a speed 5 times normal, in either forward or reverse. This feature facilitated efficient and accurate identification and recording of onset and offset times for the behaviours being coded, particularly eye-contacts which in their entirety can last for fractions of a second. Time recording, accurate to 1/25th of a second, was necessary to facilitate reliable and accurate sequential analyses conducted once the data was collected from the tapes.

These measures all necessitated the use of a spreadsheet program which could convert time data in the form of hours, minutes, seconds and hundredths of seconds into a decimal fraction, thus allowing rapid and accurate elapsed time computations for each and every puzzle-solving movement and speech act recorded as a single event. Each event that was recorded on the data collection sheets from the videotapes, with onset and offset times, was then entered into the computer spreadsheet. In original paper form, the data as events in time would not be in correct order, since behaviours were coded and recorded during different passes through the videotape. It was essential that these "events," complete with onset and offset times, could be automatically placed in ascending order by onset times, thus creating a complete picture of each child's puzzle-solving session, from start to finish and including every sequence of puzzle manipulation and utterance as they actually had meshed together. From this large computer-generated chart the time-related measures could be made, particularly the frequency of certain sequences of speech and movement as identifiable patterns of behaviour.

5.7 Inter-observer reliability

For a study of this type, it is essential to be able to demonstrate that what is being observed and coded by one observer will, to a reasonable degree, be viewed and coded as the same thing by another independent observer. Thus, how *reliable* a coding

system is will in part be a function of the simplicity and clarity of the categories, as well as how successful the categories are as being mutually exclusive (to avoid confusing two or more types of behaviour) and exhaustive (to avoid errors of omission). As described in Section 5.4, the method of data analysis was that of event recording where each target behaviour was coded and recorded as a discrete event occurring in sequence with other events. Adopting this method necessitated a coding scheme with categories that were mutually exclusive and (within the established boundaries of "on-task" behaviours) exhaustive.

For the purposes of assessing the reliability of the coding scheme and of the researcher's coding, a second observer was recruited to code independently a sample set of video data previously coded by the experimenter. The person chosen was trained to use the coding system, which entailed learning the categories and all the possible behaviours in each category. This required time to watch several sets of video-clips with the experimenter and discuss all the permutations of behaviour as they applied to each category. Once the second observer was familiarised with all aspects of the coding system, she was given a random selection of previously coded video clips from which she coded the (on-task) target behaviours. The second observer coded the entire video-clip for each selected child and used the same video equipment and coding sheets as was used for the coding of the main corpus of data.

When reliability testing, a sample of behaviour representing approximately 10% of the total data is commonly advised (Bakeman and Gottman, 1986; Hollenbeck, 1978). For this study 8 children, representing 11% of the total number of children, were selected at random to be coded by the second observer. In this sample there were five girls and three boys, who came from four of the five different classroom groups used in the Study 1. Reliability levels were assessed using Cohen's kappa statistic. This was calculated both as an overall score for each child, from which a mean overall level was derived and for each individual category.

The overall kappa values for each child ranged from .69 to .93, with a mean of .77. The kappa values were calculated for individual categories of behaviour which yielded enough data to allow other statistical analyses. As described in Chapter 6, there were 7 such categories. Kappa values were calculated for these central categories and provided the following results (overleaf):

- Puzzle-Directed, Interrogative HEUs: .83
- Puzzle-Directed, Declarative N/SRUs: .93
- Self-Directed, Declarative N/SRUs: .79
- Self-Directed, Declarative HEUs: .69
- Experimenter-Directed, Interrogative HEUs: .90
- Collaborative Expressions: .52

The degree of inter-observer agreement across these main categories was relatively high overall. The kappa value attained for "collaborative expressions" was lowest among the six verbal measures which was attributable to its low occurrence.

5.8 Coding system for analysing experimenter behaviours (Study 2)

Once it was decided this type of analysis would be undertaken, a full *experimenter behaviour* coding system was required. The scope of this was limited in a natural way by the very same contextual constraints which made the range of the children's speech acts relatively narrow. Thus the experimenters' verbal behaviours tended to be almost exclusively task-oriented. What was needed for the analysis of the experimenters' verbal behaviour was a coding system which could account for any utterances made in response to any possible speech act recorded with the Study 1 coding system. In addition, it would need to accommodate behaviours that occurred as initiators during the problem-solving. As mentioned in Section 4.2.4, this would include any time the experimenter attempted to refocus the child's attention or overcome a momentary impasse. Because solving time was the only *measurable* index of performance, it was decided that the coding system for experimenter behaviours should allow objective examination of any verbal or non-verbal behaviours which might have facilitated or even directly helped in the solving of the puzzle.

Like the children's speech act coding system, the one developed for analysing the experimenters' behaviour required a set of categories that were exhaustive (within the context) and mutually exclusive. The experimenter coding system would need to

allow the recording of every contingent verbal behaviour, thus leading to data collection sheets with category columns that would reflect any possible response to each and every one of the children's speech acts and task-related movements (Figure 5.3). However, as with the children's coding system, several sub-categories were likely to remain virtually unused. Indeed, some types of behaviour such as negative utterances and all forms of help were explicitly *avoided*.

The sheer size and complexity of such a recording system was enormously reduced by the fact that any event coded and recorded would, like its child counterpart, have a precise onset and offset time. Any experimenter behaviours, once entered into the computer program containing the counterpart set of child data and then sorted by onset times, would automatically take their place in the sequence of interactions as they occurred originally. Thus any experimenter utterance if coded as a response of some sort would be automatically defined by its juxtaposition to the child's movement or utterance immediately preceding it. The coding system, as far as experimenter responses were concerned (Figure 5.3), only required categories reflecting the overall *types* of behaviours that were of interest, such as positives, negatives, neutrals, a spectrum of possible helping behaviours, etc. Within the flow of the interaction, any type of behaviour was defined precisely by *where* it appeared with a computerised sorting function. That is to say, an experimenter's utterance of a positive remark would not be identifiable as any particular *response to the child*, until it appeared within the sorted data directly following the occurrence of a correctly placed puzzle-piece.

Behaviours which were not direct verbal responses to the children's questions or comments were far fewer in number. As mentioned, these would include spontaneous comments or questions posed by the experimenter to the child. Most of these were refocussing utterances to encourage the child to resume solving of the puzzle. These and other response categories are described in full below.

5.8.1 "Positives," "negatives" and "neutrals"

"Positives" and "negatives" were collective categories which were only used to code the experimenters' verbal responses to the children's physical manipulations of the jigsaw pieces (correct placements, incorrect placements and search sequences). The "neutrals" category, like the other two, encompassed several other sub-categories (described below) which were used to code spontaneous utterances and responses made by the experimenters.

"**Positives**" describe the verbal encouragements that were part of the standardised experimenter responses to correctly placed puzzle-pieces. They were coded as three possible types:

- *Ability*: any complimentary comment made by the experimenter following a correctly placed piece, which referred directly to the child task-ability or general competence (e.g. "you're quite good at this" or "you're a good puzzle solver.")
- *Progress*: any encouraging comment made by the experimenter which made reference to the child's progress or speed on the puzzle (e.g. "you're getting there" or "you're almost finished.")
- *Affirm/Compliment*: a slightly more generalised sub-category which included any positive remarks which directly confirmed or complimented the child's successful placement of a puzzle-piece (e.g. "yes, that's right," "good," "well done.")

"**Negatives**" describe a group of verbal sub-categories which all carried a negative tone and were made in direct response to the child's placement of puzzle pieces. They consisted of utterances which referred to the child's *ability*, *progress* and those that were directly *disaffirming* or negative. They were, in effect, the opposite of those that occurred as "positives" with the addition of a fourth sub-category called "questioning negatives." This additional category of response was intended to capture a more subtle indirect form of negative feedback which might have been expressed by the experimenters and is indeed very common in adult-child verbal exchanges. Examples

which might occur after a child incorrectly places a puzzle-piece include, "does that go there?" or "do you think that goes *there*?"

"Neutrals" formed a third main categorisation of experimenter speech acts, which in their context are clearly *not* positive or negative. These are described below.

- "*Noncommittal*" describes one of the stock responses to any child's request for helpful information or direct assistance. These in particular were quite variable, despite being part of the established verbal protocol. As described in Section 4.2.4, these were used to respond in a natural way to the children's requests, without providing any real help. In coding the experimenters' verbal behaviours, this category included any utterance which served to respond, in a "normal" conversational way, to any form of request for help. Thus, for example, following a child's question of "where does this go?" the experimenter might say a variety of things such as "hmm, I'm not sure," or "I don't know, where do you think it goes?" Because of the many unique ways a child could say something which requested help, some of these experimenter responses clearly had to be spontaneous and appropriate to the linguistic context.
- "*Neutral questions*" formed the second "neutral" sub-category which, unlike the *negative* questions described above, were not defined as utterances which responded to placement of the puzzle-pieces. They were questions posed by the experimenter which were deemed not to have any *evaluative* or indirectly helpful tone. They almost exclusively occurred as conversation facilitators as described by Bruner (1983), Vaidyanathan (1988) and others and when they (rarely) occurred, it was generally to provide conversational feedback to the child that might be strange or awkward to withhold. In response to a child's comment such as "I like the colour of the bus," the experimenter might reply "really and what is that colour?"
- "*Neutral observations*" formed the third sub-category of "neutral" speech acts and functioned identically to "neutral questions" above, where only syntax distinguished them from the former, by making them statements. For example, if a child remarked, "the lady is looking out the window," the experimenter might respond in parallel by saying, "yes, so is the little girl."

5.8.2 Responses to children's statements

An independent category was established in order to study the overall degree to which the experimenters tended to affirm or contradict the children's statements, whether they were about the puzzle, themselves or the situation in general, particularly in regard to "help-eliciting." "Statement-responses" was sub-divided simply into "*agreements*" and "*disagreements*." As described above in Section 5.7, their juxtaposition with the child's preceding utterance would ultimately define what each "meant" as a part of verbal interaction. For example, it was of interest to know if either experimenter tended to *disagree* with the children's' help-eliciting statements (e.g. "I can't do this one."), in effect giving them *encouragement*. Such possibilities were relevant to the question of whether any systematic (in this case positive) bias might have occurred which could have an impact on the children's performance or help-eliciting communication.

5.8.3 Refocussing

This category of experimenter behaviours classified the different degrees of facilitating behaviours which may have occurred during each solving session. In a loose sense, any attempt to re-engage the child's attention to the puzzle, following a distraction, could be described as "helping behaviour." Clearly there are very few three to five year olds who will complete a challenging jigsaw puzzle with no momentary impasses or lapses in attention, thus the need for occasional refocussing by the experimenter was anticipated in the design of Study 1. However, it must be acknowledged that "refocussing" might occur in a spectrum, whereby at one end there might be very subtle comments to re-orient the child's attention to the puzzle (e.g. "Iain, which is the next piece to go in?") and at the other, ones which become more and more direct and instrumentally helpful, such as pointing out aspects of the puzzle which re-engage the children *by assisting them*. Thus the overall category of refocussing became a relatively broad set of sub-categories which reflected the range of possible effects on solving time. These are described below in order of "helpfulness" from minimal to directly assisting.

"**Attention**" is used to define as any utterance made by the experimenters which simply re-focused the child's attention to the puzzle in general (e.g. "Let's carry on with the puzzle now.")

"**New piece**" refers to any utterance which in a more specific way to "attention" above, prompted the child to think about a new piece to try. (e.g. "Iain, which is the next piece to go in?")

"**Puzzle-piece/place**" refers to any occurrence when the experimenter pointed out an empty place in the puzzle and asked what might fit there, thereby re-engaging the child's efforts. It also included any utterance or gesture which identified a specific puzzle-piece as a next possible one to try in the picture (though *not* any instance of directing attention to a piece which is the *correct* one for a place previously tried with an *incorrect* piece). (e.g. Where do you suppose *this* piece might fit?" or "what piece might fit in *this* place?")

"**Observation/question**" refers to possible utterances or gestures which served to draw the child's attention to particular shapes, picture features or colours in a instrumentally helpful way. An example would be if a child were trying to fit a piece containing blue (the door of the house puzzle), into the roof area, which was all black and the experimenter says, "I think the roof was *black*," or in rhetorical question form, "what part of the house is blue?"

"**Place/show**" defines any utterance or gesture which directly indicated to the child either where a piece in hand went or pointed out the piece which correctly fit where one being attempted did not. Any instance of the experimenter actually correctly placing one of the pieces also was included in this category.

As in the coding system of the children's speech acts, tag questions and hedging statements, along with collaborative expressions were also noted as *stylistic* distinctions within any of the other types of utterances. One last category, "unclear," simply accounted for the occasional utterance which was not audible enough to recognise and code.

Consideration was given to other traditional aspects of non-verbal communication which are unintentional. These included body posture and orientation and head movement (nodding, shaking, etc.) However, it was found in the analysis of the videotapes that the experimental setting (child and adult sitting close together at a small table) and the relatively intense concentration of both experimenter and child on

the solving of the puzzle, minimised variation in "body-language." Although there were categories in the coding system which attended to such things as *leaning forward* (this occurred in a constant fashion by the experimenters) *leaning back, nod, shake head*, they were found to be virtually unused.

5.8.4 Inter-observer-reliability checks for analyses of experimenters' behaviour

The coding system devised for analysing the behaviour of the two experimenters underwent the same tests for establishing the level of reliability that the Study 1 coding system did. Using the Cohen's kappa statistic, the degree of agreement that occurred between two observers was calculated as an overall proportion, taking all categories into account and as with Study 1, levels of reliability were calculated for the individual categories in turn.

A new assistant was recruited to be trained in the use of the coding system. Although she was familiar with this research in general, she was not aware of the specific plans of statistical analysis for the data. As before, a considerable time was spent watching sample video clips (though *not* ones later selected for reliability checks) with practice taken in understanding the nuances of the classifications (described above). Once an adequate degree of accuracy was attained, seven clips were randomly selected from those previously coded by the author for the purposes of the experimenter behaviour analysis. These represented 13% of the total number of experimental sessions conducted by both experimenters (26% of total number of children's sets of data). The videotapes consisted of 5 boys and 2 girls, of whom 3 were tested with the female experimenter and 4 with the male experimenter. The level of inter-observer agreement reported is for those categories of behaviour which yielded enough data for statistical analysis. As with Study 1, several columns of verbal behaviour or sequences, inevitably remained virtually empty. Whereas in Study 1 this occurred because of the syntactic peculiarity of some categories (e.g. self-directed imperatives), in Study 2 this occurred mainly because several were designed *not to occur* (e.g. negative comments about child's ability).

The amount of data in each individual column had a large impact upon the degree of agreement observed. Overall, the level of agreement was quite high, especially in those categories that represented the largest bulk of the behaviour categories. In contrast, particularly rare utterances ("negatives"), yielded lower levels of inter-observer reliability.

Overall mean level of agreement	.76
Positive Affirmation/Compliment	.86
Negative Disaffirmations	.43
Negative Question	.37
Refocus-Attention/New Piece (pooled)	1.0
Refocus-Puzzle-Piece/Place	.78

CHAPTER 6 RESULTS OF STUDIES 1 AND 2

6.1 Procedure for statistical analysis of frequency data and sequential data

In this chapter the results for the statistical descriptions and comparisons will be reported. A description of how these results are organised precedes the findings themselves. The statistical analyses for all measures were conducted on an Apple Macintosh computer using the Statview 4.5 statistical analysis program (1995).

6.1.1 Frequency and elapsed-time data (Study 1)

Each child's raw frequency scores for each category and sub-category of verbal and non-verbal behaviour were computed from their data sheets. As described in Section 3.3.3, the scores for each of the 18 speech act categories were computed as a frequency per minute as a proportion of total utterances. Thus for example, a child who used 5 interrogative, puzzle-directed HEUs and a total of 20 utterances overall and completed the puzzle in 2.5 minutes would be given a score for that category of .10 ($5/2.5/20$). This provided an index score for each of the 18 categories which controlled for both overall talkativeness and the time taken on the puzzle. This was necessary in order to avoid effects which may have been merely a function of inter-child variance unrelated to the dimensions of behaviour being examined. For each child a similar computation was used to derive a *composite* score for each of the three orientation categories (category total/overall total per minute) as well as an overall HEU score (total HEUs per minute/overall total). As discussed in Chapter 5, data was collected for all 18 speech-act categories. Some represented behaviours which rarely if ever occurred, but were retained in an effort to have a coding system which was exhaustive. Seven of these categories yielded enough data to conduct statistical analyses and inter-group comparisons. Data columns within the *orientation* category of "experimenter-directed" were only sporadically used. Therefore these data were considered only in their combined form during comparison with the other composite scores (*puzzle-directed* and *self-directed*). In all the pair-wise gender comparisons (i.e. 7 individual categories and the composite categories) Mann-Whitney U tests were conducted, with their U-values and p-values were reported.

Direct elapsed-time measures consisted of each child's on-task puzzle-solving time, mean duration of eye-contact and mean search time per puzzle piece. Total puzzle-solving time consisted of the total on-task time taken from start to finish as defined in the coding system. The start was defined as the moment the child picked up the first piece and attempted to place it.

Further analysis of the proportional frequency data (composite HEU scores, composite N/SRU scores and total eye-contacts) was undertaken. These frequency measures were correlated with elapsed puzzle-solving time (on-task) in order to examine the relationship between problem-solving communication and actual performance (see Section 2.15). In addition, age was correlated with the composite measures of communicative behaviour. All these analyses were conducted using non-parametric correlation tests (Spearman correlation coefficient) and are reported with Rho values and p-values, except for correlations between ages and solving time, which utilised parametric Pearson correlations.

6.1.2 Sequential data

This group of analyses is discussed separately from the frequency data. They consist of measures derived from the children's verbal and non-verbal behaviour over time and in particular, combinations of verbal behaviour occurring in parallel with puzzle-solving movements.

Quartile analysis of puzzle-solving time

One important descriptive measure was made by dividing the child's solving time into quarters and then computing a new set of scores (based on the same proportion-per-minute index described above) for each verbal and non-verbal category. The time was divided into quarters to reflect the main phases which occurred naturally. In the pilot work this was found to be quite consistent: children would start the puzzle with few preconceptions of difficulty and during the first quarter would typically sort through the pieces and would quickly place any pieces which they immediately recognised. Generally, by the start of the second quarter of their total time, the subjective difficulty of the puzzle would increase and continue to do so through the end of the third quarter. Typically, in the fourth quarter of children's solving-time, they would

reach a point, where they seemed to have "cracked it" and from there the remaining pieces fell into place relatively quickly.

Dividing the time up into quarters allowed an examination of each child's communicative behaviour as he or she progressed through the puzzle, in order to identify any significant patterns that emerged. Friedman tests were used to compare the median number of composite "help-eliciting" and neutral/self-reliant utterances (proportional) in the four quarters of puzzle-solving time for the boys and girls.

6.2 Study 1 results

The findings addressing "performance" on the puzzle-task are reported prior to any findings concerned with children's use of language in this study. This is because of its inclusion in the study as a baseline point of reference from which task-oriented language could be assessed. What was observed in terms of children's elapsed time to complete the puzzle then forms a useful back-drop, before which verbal behaviour can be readily contrasted.

The coding system was designed to accommodate any possible task-related utterances and thus represented an attempt to be exhaustive in its breadth of mutually exclusive categories. One direct result of this, is to find that many categories became functionally redundant, by virtue of the scarcity of certain verbal constructions. For example, whilst "experimenter-directed," interrogative speech acts occurred regularly, puzzle-directed imperative ones (i.e. the child commands the puzzle to do something), very rarely were used (one occasion of a child commanding a piece to fit in was observed). Others, in practice, never occurred (for example, *self-directed* imperative speech acts). The findings concerned with verbal behaviour which occurred with enough regularity to conduct statistical analysis are reported. These verbal constructions occurred in seven sub-categories and represented the main corpus of data, which reflected typical language use observed among children in this context.

The order in which the solving time and verbal behaviour findings are reported, reflects the relationship that the central categories (performance, self-presentation, form of speech and orientation of speech) have to each other within the coding system. As described in the previous chapter, the coding system consists of a series of nested categories (see Figure 5.1). Thus "orientation" forms the broadest three

categories (*self-directed*, *puzzle-directed* and *experimenter-directed*). A speech act placed in any of these three categories would also be coded as either "declarative," "interrogative" or "imperative." And, finally, within one of these three categories the utterance would be determined to be either an HEU or an N/SRU. Thus for example, if a child were to say, "where does this piece go?", it would be classed as a puzzle-directed, interrogative HEU.

For inter-group comparisons on performance, a two-way factorial analysis of variance (ANOVA) was employed to compare performance (elapsed on-task solving time) across age groups and gender, with the F values and degrees of freedom (df) reported.

There were two age categories that were established that reflected the two independent age groups of children at the local council nursery school. As with the council school, the Psychology Department nursery's children normally attended for two years and thus provided two distinct age groups. Children in the younger group (council nursery and Department nursery combined) ranged in age from 2;11 to 4;3, whilst the older year's class ranged from 4;3 to 5;4. These two, very broad categories were established for the purpose of determining if any interaction emerged between age and gender in communication or task-ability. For correlational analyses between age and the various types of verbal behaviours observed, actual age (years) in decimal form was used.

A central issue that is examined in this study is the relationship that individuals' performance may have with their communicative behaviours. It is a main aim therefore to determine if any inter-group differences in patterns emerge. This examination therefore, involves a series of correlational analyses that will determine if the time taken on the puzzle (performance) predicts the use of certain types of utterances, particularly "help-eliciting" communication. Results are reported for both HEUs and N/SRUs across the various orientation categories and for the composite scores for each.

6.2.1 Problem-solving performance

A factorial (age x gender) analysis of variance conducted on the children's elapsed solving time yielded a non-significant age trend ($p=.29$) in the expected direction (see table 6.01). The younger children's on-task solving time averaged 5.74 minutes overall

($sd=2.75$) versus the older group's mean time of 4.92 minutes ($sd=3.43$). Nor did age and gender interact in any significant way. A significant negative correlation was expected between age and puzzle solving time, what appeared however, was a very weak, non-significant correlation ($r= -.14$).

Table 6.01 On-task puzzle solving time (in minutes) and age group analysis of variance

	Younger Children			Older Children			Overall (both age groups)		
	Mean	sd	Range	Mean	sd	Range	Mean	sd	Range
Overall	5.74	2.75	1.63-10.12	4.55	2.77	1.18-11.50			
Males	5.71	2.74	1.63-11.74	4.33	0.55	1.18-8.01	5.38	3.02	1.77-10.92
Females	5.78	2.84	1.80-10.38	5.62	4.37	1.77-16.52	5.06	2.63	1.18-10.57

Analysis of variance (Gender x Age) yielded non-significant results

There was no significant gender difference observed in solving time, with boys overall averaging 5.06 minutes to complete the puzzle and girls 5.70 minutes. However, there was greater variance observed in the girls' solving time, particularly among the older girls. There were also no discernible differences observed in the amount of time spent "off-task." Whilst "off-task" time was a formal measure taken for each child, in practice the occurrence of "off-task" time, in the vast majority of cases, was near zero. When off-task time occasionally occurred, it was mainly due to incidental distractions and interruptions.

The mean length of search time per puzzle-piece was recorded. This measure was addressed for its possible relevance to puzzle-solving style and strategy. Some children were observed to handle puzzle-pieces in a rapid manner, trying different pieces in quick succession; and others were seen to take a more methodical, exhaustive approach to each piece, before moving on. Within a range, search times did not appear to differ between these groups, nor predict puzzle performance, but rather reflected personal style or strategy. The duration of search time per puzzle-piece proved only to be related to age. In a predictable way, age negatively correlated (weakly) with the mean search-time ($r= -.24$), reflecting the trend for younger children

to take longer on average per piece. Conversely, very quick children tended to be older and as a function of this had brief handling times per puzzle-piece.

6.2.2 Self-presentation: "help-eliciting" and neutral/self-reliant speech acts

Following are the results obtained for comparisons across the various categories and sub-categories of verbal behaviour. As described earlier, all raw scores were converted into index scores which represented the sub-category utterances as *the number per minute, as a proportion of total speech acts*. Needless to say, this creates rather small and abstract decimal fractions in their final form. As an example to help illustrate the magnitude of a .06 difference in *proportional* median HEU scores: if two children had total proportional HEU scores of .08 and .04 respectively and each took five minutes to solve the puzzle and each had 15 speech acts overall, their respective *raw scores* would translate to 6.5 and 3.0 respectively, with one child uttering *more* than double the HEUs other in the same period of time.

6.2.3 Composite scores for HEUs and N/SRUs (gender differences)

A Mann-Whitney U test conducted on the composite (total) HEU frequency scores yielded a significant gender difference ($U=391$, $p\leq 0.01$). The girls' HEUs in this sample had a median score of .10, which was more than double that of the boys' 0.04. In direct contrast to this was the result of a Mann-Whitney U test comparing girls' and boys' use of "neutral/self-reliance" utterances. There was a significant difference ($U=467$, $p\leq 0.05$) whereby boys were using far more verbal constructions coded as being either neutral or "self-reliant" in self-presentational tone. Boys had a median score of 0.10 compared to the girls' 0.05. (see Table 6.02)

Table 6.02 Children's composite HEU and N/SRU Scores: Comparing males and females using Mann-Whitney U-tests

"help-eliciting" utterances	Males	Females	U-values	p-values
Median	0.04	0.1	391.00	0.01
Range	0.0-.56	0.0-.41		
Neutral/self-reliant utterances				
Median	0.1	0.05	467.00	0.05
Range	0.0-.62	0.0-.45		

6.2.4 Sub-category findings for HEUs and N/SRUs: form of speech and orientation

Imperative speech acts, as one of the three possible "form of speech" classifications, were not included in the sub-category analyses, because of their rarity. The results obtained from the analysis of speech acts within the other five sub-categories (*puzzle-directed* interrogative HEUs, *puzzle-directed* declarative N/SRUs, *self-directed* declarative HEUs, *self-directed* declarative N/SRUs and experimenter-directed interrogative HEUs) all indicated differences whose direction remained consistent with those in the composite scores. This consistency in the direction of trends (greater female HEU scores; greater male N/SRU scores) seems to indicate that these effects were indeed pervasive across all categories of verbal behaviour that were consistently used. These results are reported as they occurred within the "orientation" super-ordinate categories (Table 6.03).

A Mann-Whitney U test conducted on **puzzle-directed** *Interrogative* HEUs indicated a non-significant pattern of girls using these utterances more often than boys (girls' median, .04; boys' median, .02; $U=520.5$, $p=.15$). Constructions of this sort generally occurred as a request for information about the puzzle; for example: "where should this piece go?"

A comparison of male and female use of **puzzle-directed** *declarative* N/SRUs indicated a significant difference ($U=453$, $p<.05$). Boys were using this category of verbal behaviour more often than the girls, having a median score of .09 and .02 respectively. These expressions were typically neutral or "self-reliant in connotation, referring to the puzzle; for example, "this is one of the windows."

The children's **puzzle-directed** *declarative* HEUs did not reveal any significant gender differences, with equal median scores of 0.0 for girls and boys.

The comparison of female and male use of **self-directed** *declarative* HEUs, as with puzzle-directed ones, yielded significant gender differences ($U=409.5$, $p\leq.001$). Girls used these more often than boys and had a median score of .02 vs. the boys' median score of .01. These constructions were defined as statements about oneself, that carried a negative self-presentational connotation and were thus categorised as an HEU, for example, "I can't do this one" or "I'm having trouble with this piece"

The other "self-directed" category which yielded enough data to allow statistical analysis was the children's declarative N/SRUs. However, no difference in usage was observed.

Table 6.03: Sub-category HEU and N/SRU comparisons using Mann-Whitney U tests

SUB-CATEGORIES	Males	Females	U-values	p-values
Puzzle-directed interrogative HEUs				
Median	0.02	0.04	520.50	0.150
Range	0.0-.56	0.0-.34		
Puzzle-directed declarative N/SRUs				
Median	0.09	0.02	453.00	0.030
Range	0.0-.62	0.0-.36		
Puzzle-directed declarative HEUs				
Median	0.00	0.00	565.50	0.230
Range	0.0-.06	0.0-.14		
Self-directed declarative HEUs				
Median	0.00	0.02	409.50	0.001
Range	0.0-.06	0.0-.31		
Self-directed declarative N/SRUs				
Median	0.00	0.00	631.00	0.850
Range	0.0-.10	0.0-.14		
Experimenter-directed utterances (all types)				
Median	0.00	0.00	522.00	0.040
Range	0.0-.02	0.0-.04		
Hedges & tag questions (pooled data)				
Median	0.00	0.00	620.00	0.750
Range	0.0-1.64	0.0-1.96		
Collaborative exps.				
Median	0.00	0.00	525.00	0.020
Range	0.0-.01	0.0-.07		

As discussed in Section 6.1.1., use of the category "experimenter-directed," where the child's utterance contained the experimenter as the grammatical subject, was a relatively rare occurrence, but such utterances were distinctive because they were almost exclusively direct requests or commands for assistance or participation. Therefore, the sub-categories were collapsed to leave a single set of data with which to make gender comparisons.

The children's overall utterances in this category yielded median scores of zero for both the boys and girls, reflecting the general scarcity of this type of utterance. However the subtle differences between boys and girls was statistically significant ($U=522$, $p \leq .05$). The children's "neutral/self-reliant" utterances that were experimenter directed did not differ between males and females.

6.2.5 Hedges and tag questions

The analysis comparing children's use of hedges and tag questions, unexpectedly failed to uncover the gender differences predicted by the literature (see Section 2.6.2). Children across age groups and gender used these linguistic devices relatively infrequently. The two categories were collapsed in order to create a large enough data sample to make comparisons. Overall, hedges and tags were used at all by only 53% of the children, with an equal distribution across girls and boys. Both girls and boys had a median score of 0.0.

6.2.6 Use of collaborative expressions

The measure of the children's use of collaborative expressions revealed striking gender differences in the frequency of their usage. This category of verbal behaviour was distinctive for its virtually exclusive use among girls. Too few instances occurred among the boys to allow a meaningful comparison using a Mann-Whitney U test. The differing proportions of girls and boys who were observed to use this type of utterances revealed differences that were tested using a χ^2 test. 80% of those children who were observed to use this type of construction were girls. This distribution of children who used (and did not use) collaborative expressions proved to be significant ($\chi^2=5.26$, $p \leq .05$). Only 5% of the the boys used collaborative expressions compared with 25% of the girls. It was determined that among the girls,

those who used collaborative linguistic constructions, did not form a distinctive group, either in terms of age or puzzle-solving speed. They did, however, as a group, have a higher overall level of communication (total utterances of all types) than the other girls (medians $U=43.5$ $p \leq 0.01$) and boys ($U=82$, $p \leq 0.05$), possibly suggesting greater communicative motivation. In addition, these collaborative expressions, for those who used them, strongly predicted overall levels of "help-eliciting" ($Rho=.92$, $p \leq .01$). This is an intriguing yet ambiguous relationship which may suggest a connection between being linguistically engaging and being inclined to use "help-eliciting". Whether this equates with greater social motivation is difficult to determine. Too few of the boys used these constructions to make the same comparisons.

6.3 Orientation of speech acts (Study 1)

Previously the findings for categories which exist *within* the super-ordinate category of "orientation" were described. As discussed, an examination of what the children's speech acts were generally *about* was of interest in this study, particularly with regard to other research claims of greater female self-disclosure and social collaboration. Analysis in this study used a literal definition pertaining to the grammatical subject of each utterance. The results of this analysis are summarised in Table 6.04.

Puzzle-directed speech acts

In general, utterances which were "about" the puzzle, that is, where the puzzle was the subject of the speech act, revealed no significant gender differences. With regard to "help-eliciting" ones in particular, there was a non-significant trend for more frequent use by the girls. However, the boys' use of "neutral/self-reliant" utterances was significantly greater than the girls ($U=453$, $p \leq 0.05$).

Table 6.04 Proportional frequencies of utterances by orientation* and gender
(with Mann-Whitney U tests results)

PUZZLE-DIRECTED UTTERANCES		Male	Female	U-values	p-values
Sub-category total	Median	0.14	0.11	585.50	0.49
	Range	0.0-.85	0.0-.45		
Composite HEU's	Median	0.03	0.05	489.00	0.08
	Range	0.0-.56	0.0-.34		
Composite N/SRU's	Median	0.10	0.04	453.00	0.03
	Range	0.0-.62	0.0-.36		
SELF-DIRECTED UTTERANCES		Male	Female	U-values	p-values
Sub-category total	Median	0.01	0.02	489.00	0.07
	Range	0.0-.11	0.0-.44		
Composite HEU's	Median	0.00	0.01	429.00	0.01
	Range	0.0-.11	0.0-.31		
Composite N/SRU's	Median	0.00	0.00	628.00	0.82
	Range	0.0-.10	0.0-.14		

* Data within the orientation category "experimenter-directed" was pooled and is displayed in Table 6.03

Self-directed speech acts

Findings for utterances which were "about" the children themselves yielded some distinct gender differences. Considered overall, there was a non-significant trend for the girls to use these self-referential speech acts. (This difference did reach significance when children who were totally silent were excluded from the analysis¹). Considering

¹ The decision to include in the statistical analysis, children who had not spoken at all (representing 19% of the subjects) was based on two rationales: 1. Those who did not speak were mainly boys (71%), thus eliminating these children would bias the sample. 2. A child's inclination *not* to speak is not "non-behaviour", but arguably a style of interaction on the spectrum of verbal behaviour.

"help-eliciting" utterances that were about themselves, there were significantly more among the girls than the boys' ($U=429$, $p\leq 0.01$). However, no difference emerged for "neutral/self-reliant" utterances.

Experimenter-directed speech acts

As discussed in Section 6.2.4, the sub-categories within "experimenter-directed" were collapsed to allow statistical analysis. Overall, in spite of male and female median scores of zero (reflecting very low usage overall), the girls statistically used more of this type of expression (almost exclusively requests for assistance or participation) than the boys ($U=522$, $p\leq 0.05$).

Illustrated in Figure 6.01 are the relative frequencies (median values plotted) of children's overall utterances in the three orientation categories. Figure 6.02 depicts children's relative "help-eliciting" utterances in total for each orientation category. These use *frequencies as proportion of total* data to provide a less abstract impression of communicative behaviour than values *per minute* as a proportion of total utterances.

Figure 6.01 Childrens utterances in each orientation category (as proportion of total)

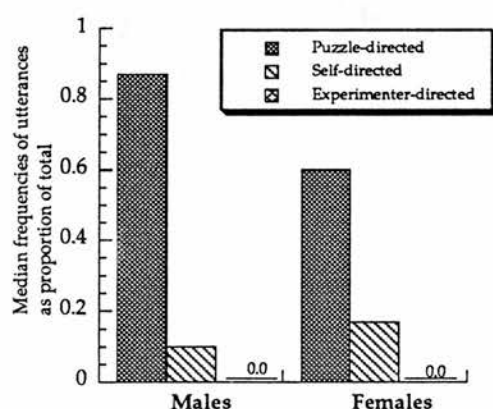
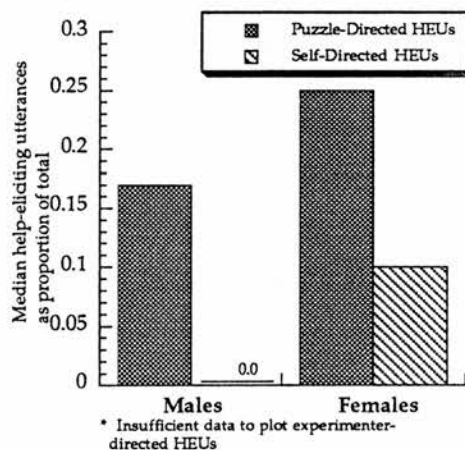


Figure 6.02 Children's help-eliciting utterances in puzzle-directed and self-directed orientations*



The children's central measures of verbal behaviour including all sub-categories, required division of these values by the total number of utterances, thus producing the proportional scores. However, those children who had not produced any verbal data during their solving session, would necessitate dividing zero by zero, a mathematical impossibility. To overcome this problem, a very small constant (.0001) was added to every value thus ensuring that all denominators in these proportion calculations would remain larger than zero, whilst not substantively changing any behaviour measures.

6.4 Eye-contact frequency and duration

These measurements (Table 6.05) were recorded to establish a set of scores that would have descriptive value to facilitate a more complete picture of the verbal and non-verbal interaction that occurred. The median duration of these behaviours would also be used to help inform inferences that might be made in reference to overall gender differences and motivations behind some speech acts.

The mean duration of eye-contacts was computed for each child and resulted in a significant gender difference. Although males and females did not differ significantly in their *frequency* of eye-contacts, the girls' mean duration of eye-contact was significantly longer than the boys' (.68 vs. .46 respectively, $U=444.5$, $p\leq 0.05$).

As mentioned in Section 3.5, it was hypothesised that the simultaneous or juxtaposed occurrences of eye-contacts with "help-eliciting" utterances may be a particularly meaningful combination and reveal a subtle clue as to the child's intended meaning. However, no discernible pattern emerged with these sequential events either with regard to differences *within* children's HEUs or differences *between* children's HEUs.

For both boys and girls puzzle-solving time significantly predicted duration of eye-contacts. Their correlations were nearly identical (girl $Rho=.54$, $p\leq .01$; boys $Rho=.53$, $p\leq .01$). It appears that the difficulty encountered on the puzzle may have had some relationship with how long one holds another's gaze, something which might be described as an aspect of *intensity* of eye-contact.

Table 6.05 Children's frequency* and duration of eye-contact

	Males	Females	U-values	p-values
Frequency				
Median	0.24	0.57	422	0.09
Range	0.0-4.22	0.0-3.42		
Duration (seconds)				
Median	0.46	0.67	473.5	0.05
Range	0.0-1.62	0.0-3.52		

* Values represent per minute data

6.5 Correlational analyses examining children's verbal behaviour (HEUs and N/SRUs) and problem-solving performance

This set of analyses was planned in order to examine the relationship that the children's verbal behaviour had with actual task performance. These are discussed in much the same order as the various frequency data results were. When *frequency* comparisons were being made in previous sections of this chapter, proportional scores were used which controlled for the children's individual differences in both solving time and overall verbosity. This created index scores for the children that represented a more conservative estimate of relative differences. However, this set of computations, whilst erring on the side of caution for estimating *frequency* differences, can possibly cause confounding effects when frequency scores are correlated with solving time. When deciding upon an appropriate form of data to use for correlational analyses, several important considerations had to be addressed.

Firstly, if raw frequency scores are used there is the possibility that a positive correlation between verbal scores and solving time will be a forgone conclusion (one might expect that given longer solving times, a child would be likely to accumulate more utterances of all types). An alternative interpretation of the same results is that the longer children take to solve a puzzle (thus the more difficult they found it) the more HEUs they may feel the need to use. It is of course possible that a combination of these effects would influence a correlation.

Secondly, correlating the type of data that was used for the frequency comparisons, the utterances *per minute as a proportion of total* data (both HEUs and N/SRUs) carries the possibility that a negative correlation with solving time may occur partly as a function of dividing a *proportion* score by the solving time. Thus longer solving times will tend to make proportional scores smaller. If these are then correlated with solving times a negative correlation may result. It is difficult, however, to predict how the myriad variations of children's raw HEUs score, overall verbosity and solving time will interact. With regard to conducting correlation analyses between verbal behaviour and solving time, it was decided that using the HEUs and N/SRUs *as a proportion of total utterances* was the best compromise between using raw scores (which cannot control for any other individual differences) and using proportion scores partially defined by solving time.

What seems clear is that no one representation of verbal data (i.e. raw data and proportional data of various types) will be *ideal* when analysing the relationship that children's verbal behaviour has with solving time. Therefore, for the purposes of displaying the different options in representing verbal data (and how correlation values change as a result), the differing correlation results of the *composite* HEU and N/SRU score correlated with solving time are presented in Table 6.06. They are also graphically portrayed in Figures 6.03 - 6.18. For all other sub-category correlations of HEUs and N/SRUs the *proportion-of-total-utterances* scores will be used.

6.5.1 Composite HEU and N/SRU scores and solving time

When using the children's simple raw HEU frequency data in the correlations, both girls and boys appeared to have significant and positive correlations with solving time using a Spearman rank correlation coefficient test (girls $Rho=.46$, $p\leq.01$; boys $Rho=.65$, $p\leq.0001$). There was a similar significant positive correlation among both girls' and boys' total N/SRU scores (girls $Rho=.37$, $p\leq.05$; boys $Rho=.47$, $p\leq.0001$). However, a surprising pattern emerged once these scores were considered in proportional form (which controlled for both verbosity and solving time) (Table 6.06). A correlation test conducted between the girls' puzzle-solving time and HEUs overall revealed a significant **negative** correlation ($Rho= -.51$, $p\leq.01$). No correlation however emerged for the boys. Thus among the girls, using data in this form, taking longer on the puzzle predicted fewer overall "help-eliciting" behaviours, a phenomenon which did not occur among the boys. The correlation measures for total N/SRUs also showed a unilateral effect: among the boys, but not the girls, neutral or positive utterances in general, correlated significantly and negatively with solving time ($Rho= -.38$, $p\leq.05$). Thus for males only, taking longer on the puzzle, significantly predicted fewer neutral or positive utterances. The potential problem of using verbal scores partially defined by solving time requires these effects to be viewed with considerable caution. However, the marked difference in the way the girls' and boys' correlations with solving time *changed* (from raw data to proportional data) is striking, although ambiguous.

Table 6.06 Children's total HEU and N/SRU scores: correlation* with puzzle solving time
(also see Figures 6.03 - 6.18)

HEUs raw data		HEUs per minute		HEUs as a proportion of total utterances		HEUs per minute as a proportion of total utterances		
Composite HEU score and solving time	Rho	p-value	Rho	p-value	Rho	p-value	Rho	p-value
Male	0.65	0.0001	0.36	0.03	0.41	0.01	0.14	0.40
Female	0.46	0.01	0.00	0.98	-0.10	0.64	-0.51	0.002

Composite N/SRU score and solving time	Rho	p-value	Rho	p-value	Rho	p-value	Rho	p-value
Male	0.47	0.003	0.22	0.18	0.01	0.97	-0.38	0.02
Female	0.37	0.03	0.04	0.84	0.08	0.64	-0.31	0.08

* Spearman Rank Correlation Coefficients

When these correlations were conducted using HEU scores *per minute* (but not controlling for overall verbosity) the potentially confounding effect of having both correlational axis partially defined by solving time, described earlier in this section, did not materialise (see Figures 6.05 and 6.06). Correlations between HEU scores (using HEUs *per minute* data) and solving time yielded a significant positive correlation among the boys but not among the girls. With regard to N/SRUs no significant relationship emerged for either boys or girls. Clearly the strong negative correlation among the girls described above cannot be explained purely as an artefact of the arithmetic involved in the calculation of HEUs *per minute as a proportion of total utterances*.

The "middle ground" was to use the children's HEUs and N/SRUs frequencies *as a proportion of total utterances* and correlate these with solving time. This allowed use of data which controlled for individual differences in overall verbosity, without the potentially confounding effect of being partially defined by time. In this case, the HEU correlations yielded patterns in the same directions as the *per minute as a proportion of total utterances* data. Among the boys there was a significant positive correlation ($Rho=.41$, $p\leq.01$) whereby their solving time strongly predicted their level of "help-eliciting". In contrast, among the girls there was a very low non-significant negative correlation ($Rho= -.10$). N/SRUs correlations were non-significant for both boys and girls.

Figures 6.03 - 6.18 display the various pairs (boys/girls) of correlations observed using different forms of HEU and N/SRU data. What seems to emerge from these sets of data is that solving time and overall verbosity (as important sources of individual differences) have a complex effect on how verbal behaviour is quantified. Considered together, the HEU correlation findings using *raw* data, HEUs *per minute* data, HEUs *as a proportion of total utterances* data and HEUs *per minute as a proportion of total utterances* data, as a group of data sets, allows one to hypothesise that among the girls there is greater diversity in underlying motivations to use "help-eliciting". Their correlations fluctuate far more than the boys' across different types of HEU data. However, as can be seen in the sequence of scattergrams for the girls, the pattern across the different types of HEU data (apart from the raw scores) either is of no correlation or a negative correlation with solving time (reaching significance with the HEUs *per minute as proportion of total utterances* data). Among the boys' there seemed to be a more "conventional" (though variable) relationship between level of

difficulty encountered and the amount of "help-eliciting". That is to say, among the boys there are no counter-intuitive patterns emerging, but rather relatively straight-forward patterns of increasing "help-eliciting" as some boys found the puzzle more difficult.

Figure 6.03 Correlation of boys' HEUs (raw data) with puzzle-solving time

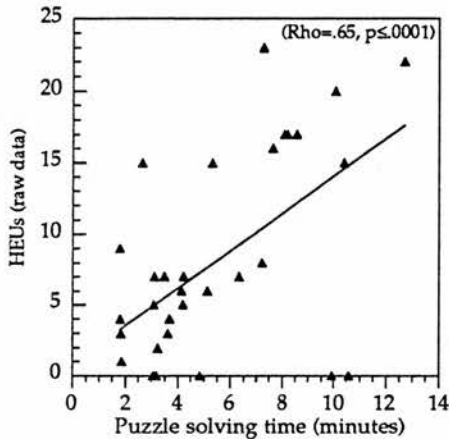


Figure 6.04 Correlation of girls' HEUs (raw data) with puzzle-solving time

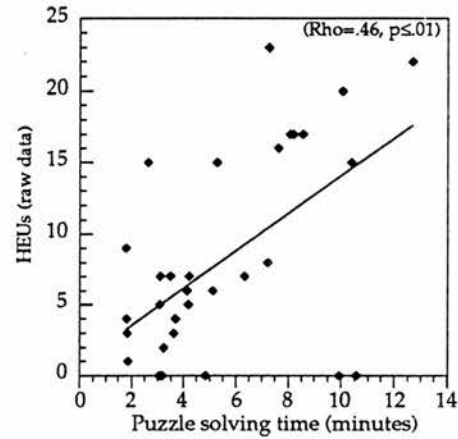


Figure 6.05 Boys' total HEUs per minute: Correlation with puzzle solving time

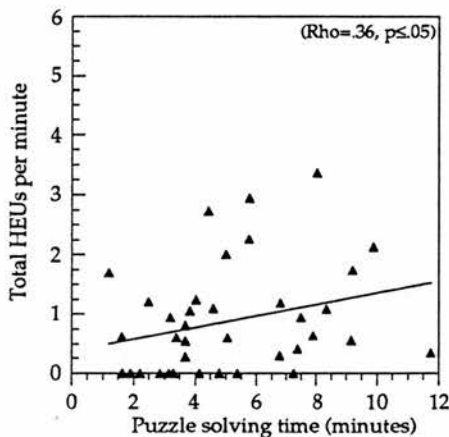


Figure 6.06 Girls' total HEUs per minute: Correlation with puzzle solving time

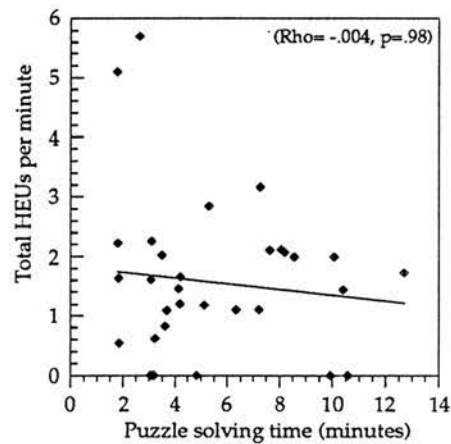


Figure 6.07 Boys' HEUs as proportion of total utterances: Correlation with puzzle solving time

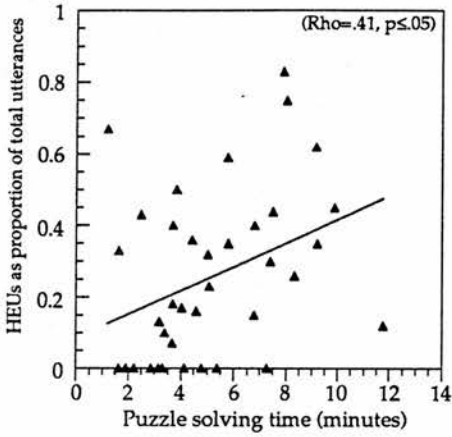


Figure 6.08 Girls' HEUs as proportion of total utterances: Correlation with puzzle solving time

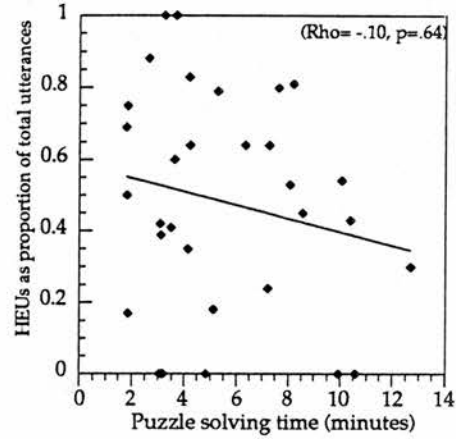


Figure 6.09 Boys' total HEUs per minute as proportion of total utterances: Correlation with puzzle solving time

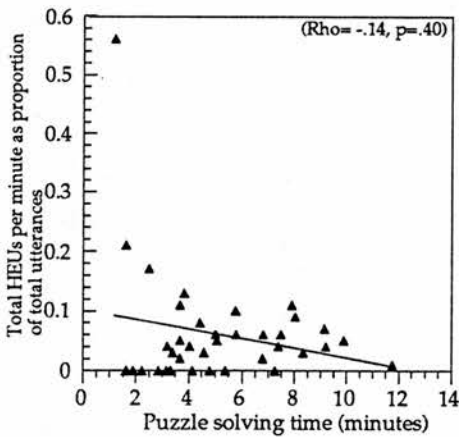


Figure 6.10 Girls' total HEUs per minute as proportion of total utterances: Correlation with puzzle solving time

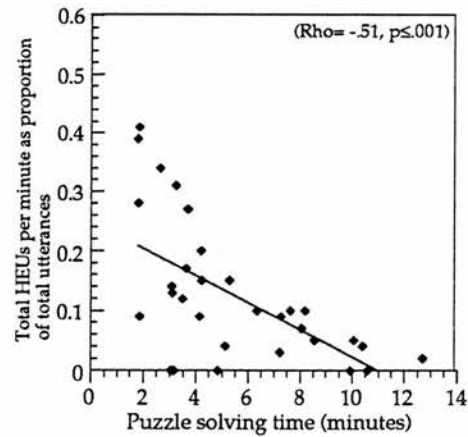


Figure 6.11 Boys' Total N/SRUs (raw data):
Correlation with puzzle solving time

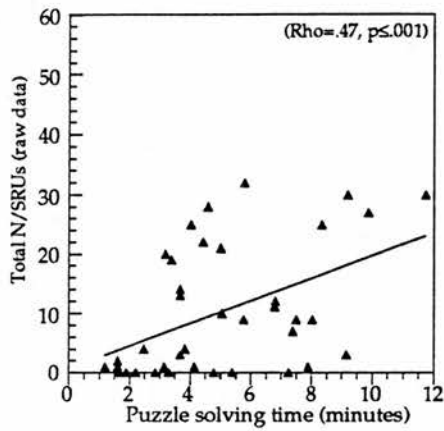


Figure 6.12 Girls' total N/SRUs (raw data):
Correlation with puzzle solving time

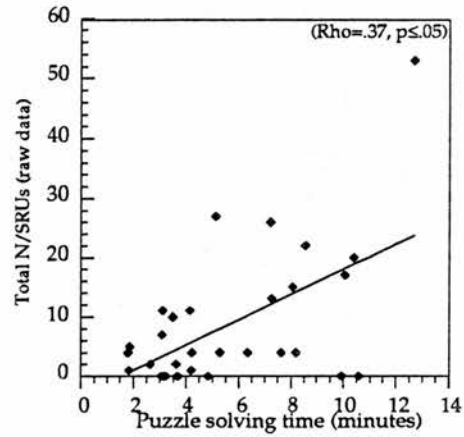


Figure 6.13 Boys' total N/SRUs per minute:
Correlation with puzzle solving time

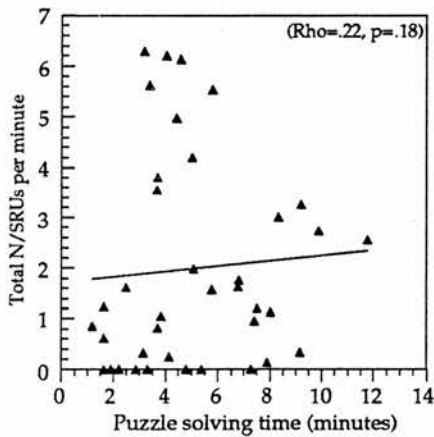


Figure 6.14 Girls' total N/SRUs per minute:
Correlation with puzzle solving time

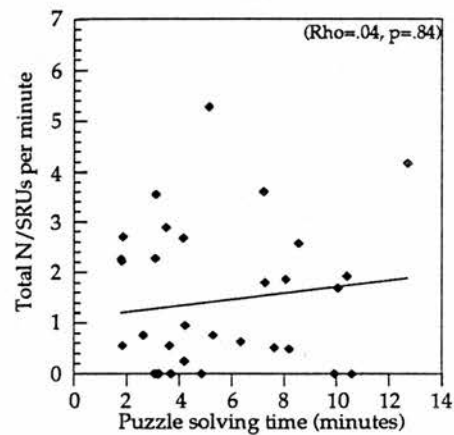


Figure 6.15 Boys' total N/SRUs as proportion of total utterances: Correlation with puzzle solving time

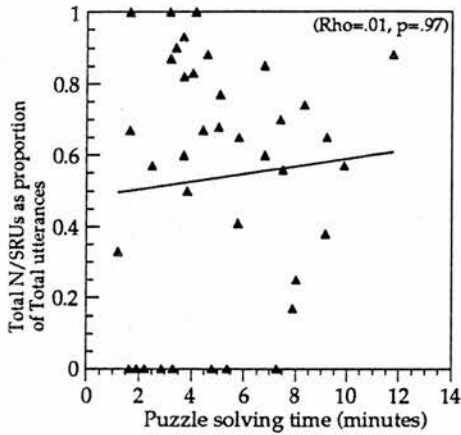


Figure 6.16 Girls' total N/SRUs as proportion of total utterances: Correlation with puzzle solving time

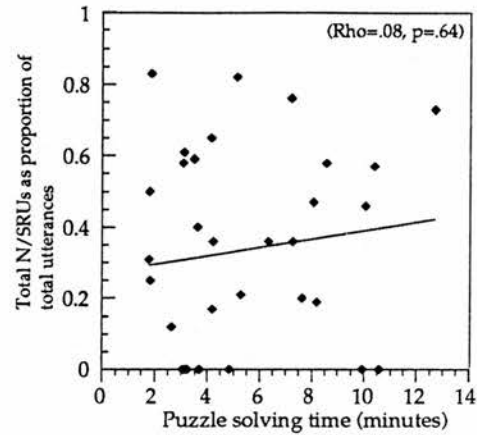


Figure 6.17 Boys' total N/SRUs per minute as proportion of total utterances: Correlation with puzzle solving time

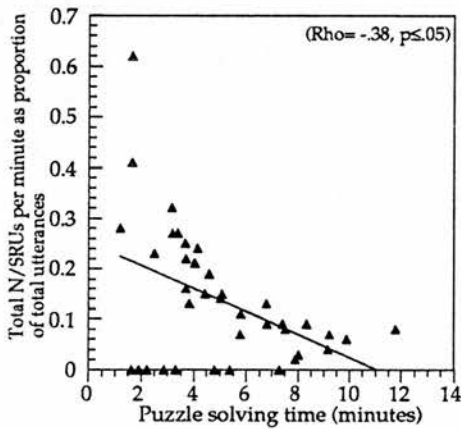
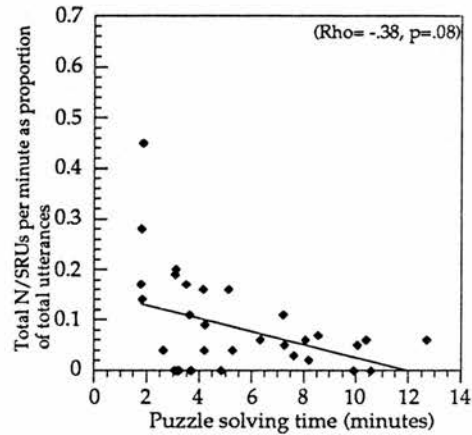


Figure 6.18 Girls' total N/SRUs per minute as proportion of total utterances: Correlation with puzzle solving time



This difference between the male and female patterns of HEU correlations is partly confirmed when comparing children on the basis of solving speed categories. When the children were divided (by median solving times) into fast and slow puzzle-solvers, then significant differences emerge in a set of Mann-Whitney U tests. Among the boys there was a significant difference in overall HEUs (using *proportion of total utterances* data) between *fast* puzzle-solvers and the *slow* puzzle solvers (median scores .08 and .36 respectively; $U=105$, $p\leq .05$). No such difference occurred among the girls (median scores .55 and .48 respectively).

The differences between males and females in the use of "neutral/self-reliant" utterances were far more subtle, regardless of how the verbal scores were manipulated. As can be seen in Table 6.06 and in Figures 6.11 - 6.18, although the boys' overall N/SRU scores were significantly greater than the girls', the sets of correlation analyses changed in *parallel* with the use of the different types of verbal data.

As stated earlier in this section, perhaps the "safest" set of data to use is the *proportion of total utterances* data. Therefore the correlation analyses conducted for the other sub-categories of HEUs, N/SRUs and solving time, used this form of data.

6.5.2 Orientation sub-categories of self-presentation and performance

Male and female HEUs and N/SRU correlations with solving time differed only very subtly within the other main sub-categories of verbal behaviour (Table 6.07), though in the same directions as the composite verbal scores. One striking correlation was between the boys' self-directed declarative HEUs and solving time. For them HEUs *about themselves* increased dramatically as solving time became longer ($Rho=.67$, $p\leq.0001$). For the girls this measure revealed no correlation whatever; their levels of self-directed HEUs remained constant across the range of solving times. Correlations between experimenter-directed utterances and solving time are also depicted in Table 6.07. As with the comparison analyses, the constituent categories were collapsed into one column (virtually all utterances were of a "help-eliciting" nature). Both girls and boys showed significant positive correlations with solving time (girls' $Rho=.35$, $p\leq.05$; boys' $Rho=.34$, $p\leq.05$).

The children's age was not found to have any significant correlation for either the boys or girls, with any of the six verbal sub-categories of behaviour (both HEUs and N/SRUs).

Table 6.07 Correlation Analyses*: HEU and N/SRU sub-category scores and puzzle solving time (using proportion of total utterances data)

SUB-CATEGORIES	Rho	p-values
Puzzle-directed interrogative HEUs		
Males	0.24	0.13
Females	0.10	0.57
Puzzle-directed declarative N/SRUs		
Males	-0.04	0.83
Females	0.15	0.39
Puzzle-directed declarative HEUs		
Males	0.22	0.17
Females	0.17	0.33
Self-directed declarative HEUs		
Males	0.67	0.001
Females	-0.07	0.67
Self-directed declarative N/SRUs		
Males	0.28	0.08
Females	0.02	0.91
Experimenter-directed utterances (all types)		
Males	0.33	0.05
Females	0.32	0.07

* Spearman Rank Correlation Coefficient

6.6 Sequential analysis using verbal and non-verbal behaviours

In this study analyses of behaviour occurring as sequences were conducted. As discussed previously, this was to identify particular combinations of behaviours or progressions in time, which may reveal important information about pre-school children's communicative behaviour in challenging problem-solving settings. These

were specifically patterns which might be relevant to making inferences about motivations underlying certain utterances, particularly "help-eliciting" ones. One measure included as a "sequential" analysis was an examination of each child's frequency of HEUs within each quartile of their total solving time, to determine if any gender differences emerged in the patterns of verbal behaviour through the course of their puzzle-solving time.

6.6.1 Quartile time analysis of HEUs

For each child, Friedman non-parametric analyses of variance were conducted on the girls' and boys' sets of HEU and N/SRU data across each quarter of solving time. These were conducted in order to determine if any significant patterns (increases or decreases) of verbal behaviour occurred. These yielded non-significant results, indicating that neither the girls nor the boys had significant patterns of changing verbal behaviour within their data across the span of solving time. However, it is noteworthy that male and female HEU scores, when compared with *each other* at each quarter of solving time, indicated that it was only in the first quarter of the children's solving time that a significant difference emerged ($U=322$, $p \leq .05$). The other three quarters, whilst showing a trend of greater female usage, yield non-significant differences. The findings for the children's N/SRU scores across the four quarters yielded few substantive differences between the boys and girls (see Tables 6.09 and 6.10).

6.6.2 Search onset to HEU elapsed time

The amount of time that elapsed from the onset of a puzzle-piece search, to the utterance of a "help-eliciting" utterance was computed as a mean value for each child. Each piece of the puzzle to some extent, represents a sub-problem within the larger problem-solving context. This measure was intended to provide data relevant to the issue of perceived "persistence" and "independence" within the puzzle. One might hypothesise that children who were quicker to utter something "help-eliciting" might *appear* to have either lower self-confidence, less task-ability or both. The mean elapsed times between the onset of "searches" and an HEUs were recorded for each child (*only for those searches in which an HEU occurred*). These proved to be unexpectedly short time durations (all averaging less than 1 second). This indicates that both boys and girls tended to utter "help-eliciting" utterances at the moment of

picking up a piece of the puzzle when beginning a search. This finding is ambiguous, but does raise the question of what exactly motivates a child to seek help on a moment-to-moment basis. It was found that males and females did not significantly differ on this measure, their mean scores were .30 seconds (sd=.26) and .32 seconds (sd=.24) respectively.

Table 6.08 Comparisons of children's HEUs* for each quarter of solving time

	Males	Females	U-values	p-values
1st Quarter				
Median	0.1	0.25	322.00	0.02
Range	0-1.25	0-2.26		
2nd Quarter				
Median	0.1	0.24	414.00	0.14
Range	0-1.69	0-2.2		
3rd Quarter				
Median	0.04	0.16	425.50	0.35
Range	0-3.38	0-2.18		
4th Quarter				
Median	0.09	0.23	287.50	0.13
Range	0-1.09	0-1.49		

* Values represent HEUs per minute as a proportion of total utterances

Table 6.09 Comparisons of children's N/SRUs* for each quarter of solving time

	Males	Females	U-values	p-values
1st Quarter				
Median	0.02	0.01	501.00	0.38
Range	0-.18	0-.12		
2nd Quarter				
Median	0.02	0.02	493.00	0.33
Range	0-.16	0-.10		
3rd Quarter				
Median	0.01	0.01	548.00	0.78
Range	0-.12	0-.14		
4th Quarter				
Median	0.01	0.00	505.00	0.39
Range	0-.15	0-.07		

* Values represent HEUs per minute as a proportion of total utterances

6.7 Results of study 2: gender of experimenter as a mediating variable in children's communicative behaviours.

6.7.1 Statistical analysis for gender of experimenter study

The aim of this follow-up study was to isolate gender of experimenter as a variable in children's spontaneous task-related communication. Therefore, the statistical design reflects the intention to determine if any effects found in Study 1 may have occurred as a result of being a male experimenter. This study was conducted in the same nurseries, at the same time of year, with no changes in teaching staff. The main set of analyses for this study involved a series of Wilcoxon tests to directly compare the main categories and sub-categories of children's verbal behaviour collected by one experimenter with that of the other. This included the children's on-task solving time recorded for each experimenter (Table 6.10). In addition, a series of Mann-Whitney U tests was conducted to determine if the direction of various gender differences among the children observed in Study 1 recurred in Study 2 for each experimenter. The main correlational analyses used in Study 1 were also repeated in this study, with the results reported for both experimenters, to allow direct comparison.

6.7.2 Pair-wise comparisons between HEU and N/SRU frequency data collected by male and female experimenter (composite and sub-categories)

Nearly all of the Wilcoxon pair-wise comparisons between the experimenter data sets failed to yield statistically significant differences. This included tests across pairs of data for all eight of the communication sub-categories (including eye-contact). The children's puzzle-solving elapsed times did not differ between experimenters, nor was gender of child found to interact in any way with gender of experimenter (Table 6.11), suggesting overall that gender of experimenter per se, as an independent variable, did not have an appreciable effect upon the solving sessions. Some of the comparisons yielded non-significant trends which are reported in order to take into consideration possible subtle differences which may be partly attributable to gender of experimenter.

Table 6.10 On-task solving time, mixed two-way analysis of variance* (Study 2)

		Male Experimenter	Female Experimenter
Boys	Mean	4.2	5.32
	sd	1.95	2.42
	Range	1.50-7.12	1.65-8.87
Girls	Mean	5.65	5.3
	sd	2.93	2.56
	Range	2.28-11.27	1.35-10.97

* Gender of experimenter x gender of child ANOVA yielded non-significant differences and non-significant interaction effects

A central measure was children's composite HEU scores (Table 6.12). Both the male and female experimenter data revealed greater use among the girls, though not reaching statistical significance. This and other non-significant gender-of-child effects is likely to be related to the lower sample size compared with Study 1. Among the children overall, more HEUs (composite) occurred in the presence of the female experimenter, a trend which also did not become statistically significant. The children's *puzzle-directed* declarative N/SRUs did occur with greater frequency with the male experimenter, though not significantly so. Conversely, *self-directed*, declarative N/SRUs occurred more frequently overall with the female experimenter, though again, not significantly so. Only one measure yielded significant inter-experimenter differences. This was the overall *puzzle-directed* neutral/self-reliant utterances among the girls (Table 6.14). They used slightly more of these speech acts with the male experimenter than the female experimenter (median = .07 and .06 respectively, $p \leq .05$).

Table 6.11 Children's composite HEU & N/SRU scores* with male and female experimenter. Results of Wilcoxon signed rank and Mann-Whitney U tests.

		Male Experimenter	Female Experimenter	Experimenter Gender Wilcoxon Test	
				z-value	p-value
"Help-eliciting" Utterances	Girls				
	Median	.07	.08	-1.28	.20
	Range	.02-.25	0.0-.44		
	Boys				
	Median	.05	.08	-.56	.57
	Range	0.0-.19	0.0-.15		
<i>Child Gender</i>	U-value	110.50	99.50		
<i>Mann-Whitney U</i>	p-value	.51	.28		
Neutral/Self-Reliant Utterances					
	Girls				
	Median	.09	.09	-.71	.48
	Range	.05-.39	0.0-.46		
	Boys				
	Median	.12	.11	-.87	.39
	Range	0.0-.57	0.0-.48		
<i>Child Gender</i>	U-value	106.00	105.00		
<i>Mann-Whitney U</i>	p-value	.41	.39		

* Values represent HEUs per minute as a proportion of total utterances

Table 6.12 Childrens' sub-Category HEU & N/SRU scores* with male & female experimenter. Results of Wilcoxon signed-rank and Mann-Whitney U tests.

		Male Experimenter	Female Experimenter	Experimenter Gender Wilcoxon Test	
				z-value	p-value
Puzzle-directed interrogative HEUs	Girls				
	Median	.03	.04	.24	.81
	Range	0.0-.19	0.0-.27		
	Boys				
	Median	.01	.04	-.49	.62
	Range	0.0-.19	0.0-.12		
<i>Child Gender</i>	U-value	85.50	117.00		
<i>Mann-Whitney U</i>	p-value	.11	.68		
Puzzle-directed declarative N/SRUs	Girls				
	Median	.07	.06	-1.89	.06
	Range	.03-.39	0.0-.37		
	Boys				
	Median	.12	.09	-.77	.44
	Range	0.0-.57	0.0-.48		
<i>Child Gender</i>	U-value	111.50	91.50		
<i>Mann-Whitney U</i>	p-value	.54	.17		
Puzzle-directed declarative HEUs	Girls				
	Median	.00	.00	-.14	.89
	Range	0.0-.05	0.0-.02		
	Boys				
	Median	.00	.00	.00	1.00
	Range	0.0-.03	0.0-.04		
<i>Child Gender</i>	U-value	126.50	124.50		
<i>Mann-Whitney U</i>	p-value	.96	.89		
Self-directed declarative HEUs	Girls				
	Median	.02	.01	-.12	.91
	Range	0.0-.08	0.0-.44		
	Boys				
	Median	.01	.01	-.78	.44
	Range	0.0-.07	0.0-.06		
<i>Child Gender</i>	U-value	112.50	104.50		
<i>Mann-Whitney U</i>	p-value	.55	.37		

* Frequencies as proportion of total utterances

Table 6.12 Childrens' sub-Category HEU & N/SRU scores* with male & female experimenter. Results of Wilcoxon signed-rank and Mann-Whitney U tests.

		Male Experimenter	Female Experimenter	Experimenter Gender Wilcoxon Test	
				z-value	p-value
Self-directed declarative N/SRUs	Girls				
	Median	.01	.02	-1.87	.06
	Range	0.0-.06	0.0-.09		
	Boys				
	Median	.01	.00	-.28	.78
	Range	0.0-.08	0.0-.12		
<i>Child Gender</i>	U-value	127.00	92.00		
<i>Mann-Whitney U</i>	p-value	.98	.16		
Experimenter- directed utterances (pooled data)	Girls				
	Median	.00	.00	-.42	.67
	Range	0.0-.03	0.0-.02		
	Boys				
	Median	.00	.00	.00	1.00
	Range	0.0-.03	0.0-.02		
<i>Child Gender</i>	U-value	95.00	101.00		
<i>Mann-Whitney U</i>	p-value	.32	.18		
Collaborative expressions	Girls				
	Median	.00	.00	-.42	.67
	Range	0.0-.88	0.0-.88		
	Boys				
	Median	.00	.00	-.54	.59
	Range	0.0-.31	0.0-.22		
<i>Child Gender</i>	U-value	85.00	82.00		
<i>Mann-Whitney U</i>	p-value	.05	.02		

* Frequencies as proportion of total utterances

Table 6.13 Orientation of children's HEUs N/SRUs with male & female experimenter with Wilcoxon signed rank test and Mann-Whitney U test results

PUZZLE-DIRECTED UTTERANCES		Male	Female	Experimenter Gender Wilcoxon Test	
		Experimenter	Experimenter	z-value	p-value
Sub-category total	Girls				
	Median	.14	.10	-.47	.64
	Range	.04-.44	0.0-.65		
	Boys				
	Median	.16	.15	-.92	.36
	Range	0.0-.57	0.0-.61		
Child gender	U-value	116.50	105.00		
Mann-Whitney U	p-value	.91	.39		
Composite HEUs					
	Girls				
	Median	.04	.04	-.54	.58
	Range	0.0-.19	0.0-.28		
	Boys				
	Median	.07	.04	-1.25	.21
	Range	0.0-.19	0.0-.12		
Child gender	U-value	66.50	127.00		
Mann-Whitney U	p-value	.03	.98		
Composite N/SRUs					
	Girls				
	Median	.07	.06	-2.11	.04
	Range	.03-.39	0.0-.37		
	Boys				
	Median	.13	.10	-1.18	.24
	Range	0.0-.57	0.0-.49		
Child gender	U-value	101.00	87.00		
Mann-Whitney U	p-value	.47	.12		
SELF-DIRECTED UTTERANCES					
Sub-category total					
	Girls				
	Median	.04	.06	-1.60	.10
	Range	0.0-.12	0.0-.44		
	Boys				
	Median	.02	.03	-.09	.93
	Range	0.0-.12	0.0-.12		
Child gender	U-value	104.00	88.00		
Mann-Whitney U	p-value	.54	.13		(cont.)

Table 6.13 Orientation of children's HEUs N/SRUs with male & female experimenter with Wilcoxon signed rank test and Mann-Whitney U test results

Composite HEUs		Male Experimenter	Female Experimenter	Experimenter Gender Wilcoxon Test	
				z-value	p-value
	Girls				
	Median	.02	.01	-.11	.91
	Range	0.0-.08	0.0-.44		
	Boys				
	Median	.00	.01	-.56	.58
	Range	0.0-.07	0.0-.06		
<i>Child gender</i>		91.50	112.00		
<i>Mann-Whitney U</i>		.26	.55		
SELF-DIRECTED UTTERANCES					
Composite N/SRUs					
	Girls				
	Median	.01	.02	-1.54	.12
	Range	0.0-.08	0.0-.09		
	Boys				
	Median	.01	.00	-.30	.77
	Range	0.0-.08	0.0-.12		
<i>Child gender</i>		110.00	89.00		
<i>Mann-Whitney U</i>		.71	.13		

The frequency data collected for both children's inter-group and for inter-experimenter comparison (Table 6.12) were not normally distributed. This precluded a factorial analysis of variance conducted on the frequency data (see analysis discussion), which could have specifically tested for any gender-of-experimenter \times gender-of-child interactions. However, for the purposes of uncovering any clear interactions across the central measures (composite HEU scores; composite N/SRU scores) data were converted to logarithmic values, thus providing data which could appropriately be subjected to parametric analyses. Factorial ANOVAs conducted on these data failed to reveal any significant interaction effects ($F=2.76$).

6.7.3 Use of collaborative expressions (Study 2)

The comparison of the children's use of collaborative expressions across the data from the two experimenters revealed a very similar pattern as in Study 1. As previously, these were very infrequent utterances overall. However, data from both experimenters indicated greater usage among the girls (male experimenter, $U=85$, $p\leq.05$; female experimenter, $U=82$, $p\leq.05$). The distribution of girls and boys as users of this type of construction revealed differences in the same direction as in Study 1, though not to significant significant levels. During solving session with the female experimenter 88% of all those who used collaborative expressions were girls, 12% were boys. Among the girls 41% were observed to use these utterances, whereas among the boys this proportion was only 12.5% ($\chi^2=5.06$, $p=.06$). The findings from the data collected by the male experimenter were virtually identical, with relative proportions of female to male usage as 80% and 20%. Only 13% of the boys used collaborative expressions, compared with 47% of the girls ($\chi^2=4.22$, $p=.09$).

6.7.3 Correlation analyses for male and female experimenter

Some inter-experimenter differences did emerge in a comparison of results obtained for the main correlational analyses (Table 6.14). Composite HEU scores (frequency as proportion of total utterances) collected with the male experimenter did not significantly correlate with puzzle-solving time among boys and girls. However, boys' composite HEU scores collected with the female experimenter did significantly and positively correlate with puzzle-solving time ($Rho=.55$, $p\leq.05$), a result which was consistent with the findings of Study 1. This suggests a similar discrepancy between the patterns of "help-eliciting" to that observed among the girls and boys in Study 1. The correlations conducted on the children's "neutral/self-reliant" data and solving time also revealed a different pattern between the boys and girls. A marginally non-significant negative correlation occurred among the boys when solving the puzzle with the female experimenter ($Rho= -.50$, $p=.06$), though not appearing with data collected by the male experimenter ($Rho=.06$, $p=.83$). The girls' N/SRU data was not predicted by their solving time for either experimenter.

Table 6.14 Children's total HEU and N/SRU scores*: Correlation** with puzzle solving time (Study 2)

		Male Experimenter		Female Experimenter	
		Rho	p-value	Rho	p-value
Composite HEU scores and solving time	Boys	.40	.14	.55	.04
	Girls	.40	.11	.12	.63
Composite N/SRU Scores and Solving Time	Boys	.06	.83	-.50	.06
	Girls	-.24	0.34	.00	.99

* as proportion of total utterances

** Spearman Rank Correlation Coefficient

Girls' and boys' sub-category correlations with solving time are reported for the male and female experimenter in Table 6.15. Results in general were quite mixed. Whilst some categories yielded non-significant correlations which did not differ either between experimenters or across children (e.g. puzzle-directed interrogative HEUs and experimenter-directed utterances), others indicated significant correlations which fluctuated across gender of children and the two experimenters. Puzzle-directed declarative N/SRU correlations revealed patterns which went in opposite directions for each experimenter. The girls' solving time predicted (negatively) their N/SRU scores with the male experimenter data ($Rho = -.52$, $p \leq .05$), whilst indicating virtually no correlation with the female experimenter data ($Rho = .06$, $p = .81$). This reversed among the boys, where the female experimenter data indicated a significant negative correlation ($Rho = -.60$, $p \leq .05$) and the male experimenter data indicated no correlation ($Rho = .05$, $p = .86$).

The children's *puzzle-directed* declarative HEU correlations with solving time revealed significant patterns among the girls, but not the boys. The girls' solving time predicted HEUs in this category for both experimenters' data (male experimenter, $Rho = .54$, $p \leq .05$; female experimenter, $Rho = .53$, $p \leq .05$).

The previous effect in the *self-directed* declarative HEU category reversed itself for the boys and girls, but only for the female experimenter's data (boys, $Rho = .74$, $p \leq .01$; girls, $Rho = .05$, $p = .83$).

The one other significant correlation which emerged from this set of analyses was the girls' self-directed N/SRUs, which *increased* with solving time in the male experimenter data ($Rho=.48$, $p\leq.05$).

Overall, the data generated with the male experimenter and the female experimenter were more striking for their similarities than for their differences. In part this will be a function of the procedure used in the experimental sessions: both experimenters used a pre-arranged set of stock responses and initiations during the solving sessions with the children (see experimental procedure, Section 4.3.2). These were to maximise consistency in the use of refocusing techniques, in the way questions were to be answered and in the general level of involvement with the child. These were intended to provide a neutral presence, without providing help on the puzzle, yet with the experimenter still remaining as friendly and naturalistic as possible. Given these fairly strict interaction procedures, the differences which did occur as a result of the gender-of-experimenter variable, seem likely to be the least that one could expect in a more open and social setting.

Table 6.15 Correlation analyses*: HEU and N/SRU sub-category scores** and puzzle solving time

SUB-CATEGORIES	Male Experimenter		Female Experimenter	
	Rho	p-values	Rho	p-values
Puzzle-directed interrogative HEUs				
Boys	.19	.47	-.32	.23
Girls	.12	.63	.07	.79
Puzzle-directed declarative N/SRUs				
Boys	.05	.86	-.60	.02
Girls	-.52	.04	.06	.81
Puzzle-directed declarative HEUs				
Boys	.27	.31	.49	.06
Girls	.54	.03	.53	.04
Self-directed declarative HEUs				
Boys	.23	.38	.74	.01
Girls	.23	.35	.05	.83
Self-directed declarative N/SRUs				
Boys	.25	.35	-.32	.23
Girls	.48	.05	.23	.36
Experimenter-directed[†] HEUs (pooled)				
Boys	-.25	.35	-.06	.82
Girls	.18	.48	.11	.67

* Spearman rank correlation coefficient

** as proportion of total utterances data

† insufficient data to conduct correlation analysis for Exp-Directed N/SRUs

6.8 Study 2 as a partial replication study

The results obtained in Study 2 in many ways confirm the effects observed in Study 1. In this sense it is a partial replication study with which one can examine the *direction* of important trends found in the Study 1. Time constraints and the design for Study 2, as a within-subjects, repeated measures study limited its sample size. There were 32 children who participated in this study, compared with more than twice that in Study 1 (71); thus it can not be classed as a full replication study. However, a review of the overall findings provides a rough indication of the robustness of earlier findings.

Both experimenters' data relating to girls' and boys' use of "help-eliciting" verbal behaviours confirmed the direction of differences found in Study 1. These showed greater frequency among the girls, in spite of parity in on-task puzzle-solving time. These patterns of behaviour, as in Study 1, persisted across most of the smaller sub-categories of "help-eliciting" behaviours, although at non-significant levels. The direction of gender differences in use of neutral or "self-reliant" utterances also recurred in the follow-up study, though to a lesser degree. This was also the case for the children's use of collaborative expressions for both experimenters, whereby a far greater proportion of the children who used these utterances were girls.

In Study 1, differences were observed in how girls' and boys' levels of HEUs and N/SRUs changed with increased solving times. For boys only, longer solving times predicted increased levels of "help-eliciting" overall (using *proportion of total utterances* data), whereas the pattern for the girls was a very weak (non-significant) negative correlation. As discussed in Section 6.5, the *type* of data used was an important factor (the pattern described previously became statistically significant when using *per minute as a proportion of total utterances* data). For correlation analyses in Study 2, the more conservative HEU and N/SRU *frequencies as a proportion of total utterances* data was used. In Study 2, the correlation pattern for overall HEUs recurred, whereby boys' "help-eliciting" increased significantly with solving time ($Rho=.40$, $p\leq.05$), though girls' did not. Conversely, with regard to children's N/SRUs, these *decreased* with greater solving time among the boys when with the female experimenter, though not to a significant degree ($Rho= -.50$, $p\leq.06$).

The data from Study 2, regarding the children's use of collaborative expressions, also repeated the findings in the Study 1. Girls in Study 2 were nearly exclusively the producers of utterances containing collaborative constructions using the words: "us" and "we." This was observed as a significant difference in the female experimenter data ($U=79$, $p\leq.05$) and as a weaker trend in the male experimenter data ($U=88.5$, $p=0.08$).

6.9 Comparison of Study 1 data and Pilot Study data: the effects of task difficulty on "help-eliciting" frequency

In the concluding discussions of the Pilot Study (Chapter 3) it was mentioned that the task presented to the children was solvable by most of the children, but that it may have been excessively challenging. It was hypothesised that the difficulty of the puzzle may have swamped any subtle differences between the boys and girls in this study. That is, although it was hypothesised that the girls' level of "help-eliciting" would be greater than the boys, the difficulty encountered in the pilot study puzzle may have rendered both girls' and boys' "help-eliciting" more strictly task-oriented and thus equally "necessary." It was decided that for the full study a slightly easier puzzle would be used to avoid extinguishing any gender differences that might only be detectable in problem-solving situations which are challenging, but not overwhelming.

As reported in previous sections of this chapter, there were indeed gender differences on various dimensions of communication, but most strikingly in the relative amounts of "help-eliciting". These findings overall supported the belief that girls' and boys' task-related communication may be differentially affected by task difficulty; or to conceive of it differently, they may adjust their communicative behaviour according to the demands placed upon their problem-solving concentration and attention. The differences in the findings of Study 1, including the correlation analyses, generated the hypothesis that task-difficulty may be a mediating factor in male and female "help-eliciting" differences, rather than there being simply a "blanket effect" of greater female "help-eliciting" across all levels of difficulty. This hypothesis was explored further by analysing the level of "help-eliciting" for males and females in each of the two studies.

The comparison of the two data sets depends on treating the two subject groups as comparable sets, which to a large extent they were. Departmental nursery children were represented in both data sets; the time of year was approximately the same, ensuring that the groups of children were approximately matched for age; and the problem-solving setting was virtually identical. Differences uncontrolled for were limited to the improvements in the experimental procedures for Study 1 (e.g. more standardised experimenter behaviour system). Comparisons (using Mann-Whitney U tests) had to be limited to children's total HEU scores as a proportion of total

utterances, since the breadth of the coding system in Study 1 was far greater than in the pilot study.

When directly comparing the girls from the two different studies, it was found that they did indeed differ significantly in terms of the frequency of their "help-eliciting" utterances. Those in the pilot study, solving the more difficult puzzle, had a median score of .03, far *fewer* HEUs than the group of girls in Study 1 using an easier puzzle who had a median score of .10 ($U=88$, $p\leq 0.001$). In sharp contrast, the boys in the two puzzle-groups did not yield any significant differences.

From these results one might surmise that male and female children respond very differently to task-difficulty with regard to the frequency of utterances which imply a need or desire for help. To reiterate the gender comparison results of the two studies: no overall differences appeared among children in the pilot study when tested with a particularly difficulty task. In contrast, when a very similar group of children were studied using a challenging but less difficult puzzle, significant gender differences emerged ($U=391$, $p\leq .01$). As discussed in Chapters 7 and 9, these results seem quite relevant to the discussion of gender differences in social motivation and language use, but do have to be interpreted with some care, since it is a comparison across time and different experimental groups. The Department Nursery children formed a more homogenous group, coming from mainly middle to upper-middle class families; whilst those observed in the local council nursery school came from a slightly broader range of middle class and working class families.

The concern with the possible differences between the two experimental groups was addressed by statistically comparing them on both performance and "help-eliciting" measures. This was done for males and females separately and yielded the following results.

- A comparison of the solving times (for the easier bus puzzle) of Department Nursery girls and local council nursery girls using an unrelated t-test, yielded a non-significant difference in performance. Mean solving times were 5.10 minutes, $sd=2.98$ and 5.49 minutes, $sd=3.10$ respectively ($t= -.31$, $p=.76$).

- A comparison of the solving times (for the easier bus puzzle) of Department Nursery boys and local council nursery boys using an unrelated t-test, also yielded a non-significant difference in performance. Mean solving times were 4.34, $sd=2.35$ and 5.21, $sd=2.70$ respectively ($t=-.80$, $p=.43$).
- A comparison of the composite (proportional) scores (for the easier bus puzzle) for "help-eliciting" between the Department Nursery girls and local council nursery girls, using a Mann-Whitney U test, yielded a non-significant difference. Median scores were .11, range 0 - .39 and .09, range 0 - .40 respectively ($U=113$, $p=.76$).
- A comparison of the composite (proportional) scores (for the easier bus puzzle) for "help-eliciting" between the Department Nursery boys and local council nursery boys, using a Mann-Whitney U test, yielded a non-significant difference. Median scores were .03, range 0 - .13 and .04, range 0 - .56 respectively ($U=79$, $p=.26$).

These findings appear to counter the possibility that the two groups of children were too different on the relevant measures to allow meaningful inferences to be drawn from the comparisons between data gathered from the Pilot Study and Study 1. These comparisons centred on differences in solving time and relative amounts of "help-eliciting" behaviour as reported below.

- A comparison of the girls' *solving time* data in the difficult puzzle "condition" (Pilot Study) and the easier puzzle "condition" (Study 1) yielded a significant difference. Those girls solving the more difficult puzzle were significantly slower (mean elapsed time, 7.60 minutes, $sd=3.15$) than those solving the easier puzzle (mean elapsed time, 5.37 minutes, $sd=3.02$) ($t=-2.21$, $p\leq.05$).

- A comparison of the boys' *solving time* data from the difficult puzzle "condition" (Pilot Study) and the easier puzzle "condition" (Study 1) yielded a significant difference. Those boys solving the more difficult puzzle (mean elapsed time, 7.18 minutes, $sd=4.05$) were on average slower than those solving the easier puzzle (mean elapsed time, 5.05 minutes, $sd=2.63$) ($t= -2.07$, $p\leq.05$).
- A comparison of the girls' (proportional) composite "*help-eliciting*" data in the difficult puzzle "condition" (Pilot Study) and the easier puzzle "condition" (Study 1) yielded a significant difference. Those girls solving the more difficult puzzle used significantly *fewer* HEUs (median score, .03, range, 0-.06) than those solving the easier puzzle (median score, .10, range, 0-.41) ($U=88$, $p\leq.001$).
- A comparison of the boys' (proportional) composite "*help-eliciting*" data in the difficult puzzle "condition" (Pilot Study) and the easier puzzle "condition" (Study 1) yielded no significant difference (easier puzzle median scores=.03, range, 0-.38; difficult puzzle median scores=.04, range, 0-.56) ($U=197.5$, $p=.78$).

The findings above would appear to support the hypothesis that there are substantive differences in the way girls and boys respond verbally to the level of difficulty they encounter in a problem-task. As with the earlier correlational analyses, these findings are clearly suggestive of a gender difference, although one must interpret them with a great deal of care. The combination of correlational analyses that were presented (Section 6.5) should be interpreted as indicating possible gender effects that are strongly affected by individual differences and that exclusive gender dichotomies do not exist. The same caution is appropriate here as well. What remains as a conclusion is that for *some* girls in particular, "*help-eliciting*" will not necessarily be predictive of either desire or need for help (in its narrowest sense) during a challenging task.

6.10 Results of analysis of experimenter behaviours, Study 2

Analysing the behaviour of the two experimenters was undertaken for two important reasons that were described in Section 4.4. Firstly, it served as a formal examination

of variation in behaviour which may have naturally emerged from the design intentions of Study 1 (we wanted to avoid interacting with the children in an overly scripted and unnatural way, whilst retaining a degree of standardisation across different children). Secondly, it provided a means of closely examining the experimenters' interactional style with the children, to determine if there might be any particular patterns which could have *contributed* to the effects found in both Study 1 and Study 2.

6.10.1 Procedure for analysis of experimenter behaviour data

Some categories of behaviour were frequently used simply because those behaviours (e.g. positive responses to correct placements; non-committals following a HEU) were part of the established response routine. Others (e.g. "observation/point-out" and "place-piece") were very rare because being to one side of the "helping" spectrum, they were designed *not* to occur. Low or no-occurrence of some behaviours prevented any statistical analysis, whilst those which could be meaningfully collapsed, were.

One behaviour of interest was "puzzle-place/piece," referring to utterances which re-focused the children by asking them to switch attention to a specific piece or place in the puzzle. This was the only "re-focusing" behaviour (of relatively low "helpfulness") which occurred often enough to allow statistical analysis. Therefore it became the central measure with which to examine possible differences in the way the experimenters responded to perceived distractions, difficulties and requests for help. The frequency of these were examined, as well as their correlation with the children's solving time, overall "help-eliciting" and orientation sub-categories of HEUs.

The categories within the heading "positives" were collapsed into one column, since the vast majority were "affirmation/compliments" (e.g. "well done," "that's right"). "negatives" containing the sub-categories for *ability*, *progress*, *disaffirmation* and *question*, were all extremely rare (zero in both ability and progress negatives) and did not allow statistical analysis.

The examination of the data involved two main approaches. One was the comparison of the simple frequency of certain behaviours, including those defined by their occurrence as part of a sequence. These results are compared and reported for inter-experimenter differences with girls and boys separately, using Wilcoxon signed-rank tests. Differences between child genders (for each experimenter) were also examined using Mann-Whitney U tests.

The other set of analyses consisted of correlation tests between the children's solving time ("performance") and experimenters' verbal behaviour. These analyses were mainly concerned with possible relationships between how fast (or slow) the children were and the amount of encouragement and helpful remarks they received. Correlation tests were also conducted to determine if any relationships emerged between the children's level of "help-eliciting" and degree of encouragement and helpful remarks they received.

6.10.2 Frequency data results for experimenter behaviours

Table 6.16 displays the findings for overall frequency of verbal behaviours, for both experimenters, that were made in response to the children's progress on the puzzle and the responses to the children's questions and comments, ranging across the categories of positives, neutrals and negatives.

Positives, neutrals and negatives

As mentioned above, although the coding system provided for three types of positive remarks in response to correct placement, only one ("affirmation/compliment") was used regularly enough to allow statistical analysis. "Positives" were therefore pooled together. Neither experimenter used these types of utterances differentially between the boys and the girls, although a significant difference was observed *between the two experimenters* when interacting with the boys, with a median frequency of 4.74 and 2.38 per minute for the male and female experimenter respectively ($z=-2.42$, $p\leq 0.05$).

The experimenters' use of "neutrals" overall was examined along with this category's constituent sub-categories. The male experimenter appeared to have used these types of utterances more than the female experimenter, when interacting with the girls. (median occurrence per minute 1.87 versus .87, $z=-2.50$, $p\leq 0.01$) This difference appears to have derived primarily from the sub-category of "neutral/non-committals" which indicated a significant difference between the two experimenters when interacting with the girls ($z=-2.92$, $p\leq 0.01$), but not with the boys. Such utterances consisted of comments such as "hmm, I don't know" (or just "hmm..."). When re-examining the videotapes it was observed that the male experimenter indeed, seemed to employ these minimal responses, like "hmm" a great deal. However, as with both "positives" overall and "neutrals" overall, no difference in interaction between the boys and the girls was observed for either experimenter.

Table 6.16 Frequency data for experimenter behaviours (male & female) across gender of children. Comparison using Wilcoxon signed rank and Mann-Whitney U tests

			Male	Female	Experimenter Gender	
			Experimenter	Experimenter	Wilcoxon Test	
					z-value	p-value
Positives (pooled)	Girls	Median	3.86	2.82	-.18	.86
		Range	1.15-7.00	1.08-5.93		
	Boys	Median	4.74	2.38	-2.42	.02
		Range	1.94-9.71	.90-8.06		
Child Gender		U-value	59.00	62.00		
Mann-Whitney U		p-value	.20	.41		
Neutrals Overall	Girls	Median	1.87	.87	-2.50	.01
		Range	.39-4.00	0.0-1.49		
	Boys	Median	1.34	1.26	-.87	.38
		Range	0.0-3.41	0.0-3.66		
Child Gender		U-value	65.00	5.50		
Mann-Whitney U		p-value	.33	.24		
Neutral Non-Committals	Girls	Median	1.15	.37	-2.93	.001
		Range	.39-3.33	0.0-.99		
	Boys	Median	1.03	.58	-1.36	.17
		Range	0.0-3.41	0.0-2.20		
Child Gender		U-value	64.00	54.00		
Mann-Whitney U		p-value	.30	.21		
Neutral Questions	Girls	Median	.19	.00	-1.01	.31
		Range	0.0-.67	0.0-1.08		
	Boys	Median	.00	.20	-.87	.39
		Range	0.0-1.22	0.0-1.47		
Child Gender		U-value	79.50	59.50		
Mann-Whitney U		p-value	.80	.32		
Neutral Observations	Girls	Median	.26	.24	-.06	.95
		Range	0.0-.85	0.0-.82		
	Boys	Median	.15	.07	-.53	.59
		Range	0.0-.84	0.0-.57		
Child Gender		U-value	75.00	60.50	(cont.)	
Mann-Whitney U		p-value	.63	.35		

Table 6.16 Frequency data for experimenter behaviours (male & female) across gender of children. Comparison using Wilcoxon signed rank and Mann-Whitney U tests

			Male Experimenter	Female Experimenter	Experimenter Gender Wilcoxon Test	
					z-value	p-value
Negatives Overall	Girls	Median	.00	.27	-1.83	.06
		Range	0.0-.46	0.0-.74		
	Boys	Median	.00	.00	.00	1.00
		Range	0.0-.95	0.0-.51		
Child Gender		U-value	75.50	50.00		
Mann-Whitney U		p-value	.59	.11		
Negative Disaffirmation	Girls	Median	.00	.00	-1.75	.08
		Range	0.0-.25	0.0-.37		
	Boys	Median	.00	.00	-1.46	.14
		Range	0.0-.56	0.0-.38		
Child Gender		U-value	77.00	69.00		
Mann-Whitney U		p-value	.52	.61		
Negative Question	Girls	Median	.00	.00	-1.52	.13
		Range	0.0-.37	0.0-.74		
	Boys	Median	.00	.00	-.85	.40
		Range	0.0-.95	0.0-.37		
Child Gender		U-value	70.00	57.00		
Mann-Whitney U		p-value	.36	.20		
Re-Focus: Attent./New Piece (pooled)	Girls	Median	.30	.00	-1.01	.31
		Range	0.0-.75	0.0-.73		
	Boys	Median	.00	.00	-.94	.35
		Range	0.0-.84	0.0-.46		
Child Gender		U-value	81.50	69.00		
Mann-Whitney U		p-value	.90	.56		
Re-Focus: Puzzle-Piece/ Place	Girls	Median	.46	.27	-.66	.51
		Range	0.0-3.75	0.0-1.23		
	Boys	Median	.54	.18	-.66	.51
		Range	0.0-2.86	0.0-1.60		
Child Gender		U-value	78.00	73.50	(cont.)	
Mann-Whitney U		p-value	.69	.84		

Table 6.16 Frequency data for experimenter behaviours (male & female) across gender of children. Comparison using Wilcoxon signed rank and Mann-Whitney U tests

			Male Experimenter	Female Experimenter	Experimenter Gender Wilcoxon Test		
					z-value	p-value	
Re-Focus: Observation/ Point-out	Girls	Median	.00	.33	-1.52	.12	
		Range	0.0-.74	0.0-1.24			
	Boys	Median	.00	.00	-1.00	.32	
		Range	0.0-.92	0.0-.68			
	Child Gender		U-value	78.00	61.00		
	Mann-Whitney U		p-value	.69	.17		
Re-Focus: Place-Piece	Girls	Median	.00	.00	-1.00	.32	
		Range	0.0-0.0	0.0-.27			
	Boys	Median	.00	.00	-1.10	.27	
		Range	0.0-.15	0.0-.23			
	Child Gender		U-value	78.00	74.00		
	Mann-Whitney U		p-value	.35	.77		
Collaborative Expressions	Girls	Median	.27	.00	-2.03	.04	
		Range	0.0-1.00	0.0-.24			
	Boys	Median	.08	.00	-2.37	.02	
		Range	0.0-.69	0.0-.15			
	Child Gender		U-value	64.50	65.00		
	Mann-Whitney U		p-value	.29	.35		

The second sub-category of "neutrals" was "neutral questions." For this type of utterance, no differences were found either between experimenters or for either experimenter across genders of children. This was also the case for the third "neutral" sub-category, called "neutral observations."

Verbal categories were established for observing possible occurrences of *negative* remarks made to the children in response to their progress on the puzzle (presumably as might occur with an incorrect placement). Two of the four sub-categories, "negative-ability" and "negative-progress" did not occur at all and were collapsed into the overall category. However, in terms of both "negatives" overall and within the other two (virtually unused) sub-categories ("disaffirmation" and "negative question")

there were no differences observed in the interaction across girls or boys, for either experimenter.

Re-focusing behaviour

The behaviour of the two experimenters with regard to the frequency of their "re-focusing" utterances (which as described, included categories ranging from minimally helpful to directly helpful) was of particular interest for this part of the study. These behaviours occurred as a function of the experimenters' *perceptions* of the child and his or her progress. Although the explicit intention was not to provide help in any substantive way, any inclination to prompt the child during a lapse in attention or momentary impasse, was ultimately an *interpretation of the context* with regard to either of these. That is, the decision to say "well, what about that piece?" (the predominant type of "re-focus") had to be based on a judgement of the child's moment-to-moment engagement with the task.

The latter pages of Table 6.16 summarise the findings for the experimenters' refocusing behaviour with the children. Although no significant differences were observed across the four sub-categories of "refocus" (either between experimenters or across gender of child) this will remain an important issue for further research that could involve more adults behaving in a natural, spontaneously way, who clearly would not be operating with a predetermined "script" for interacting with boys and girls.

Surprisingly, there were significantly more collaborative expressions observed in the male experimenter's interactions with both the girls and the boys. In the interactions with the girls, the median frequency of collaborative expressions was .27 and .00 for the male and female experimenter respectively ($z = -2.03$, $p \leq .05$). With the boys this difference was also significant, their median frequencies being .08 and .00 respectively ($z = -2.37$, $p \leq .05$). There were no differences in either experimenters' use of collaborative expressions *between* the girls and boys.

6.10.3 Sequential analysis results for experimenter behaviours.

Omission of positives

The verbal behaviours described previously were largely "response-behaviours" occurring in the adult-child interaction and as such are technically "sequential data." However, one verbal behaviour in this study was of interest and was definable, by virtue of its occurrence or failure to occur as part of a sequence. The omission of an affirmative or complimentary remark following the correct placement of a puzzle piece was thought to be one such "event" that might be of importance, were it to occur often enough to affect the character of the interaction overall. The frequency of these "non-events" was examined between experimenters and across gender of child. When interacting with the girls, no inter-experimenter differences emerged (Table 6.17).

Responses to children's "help-eliciting" utterances

One broad category of sequential interactions was the experimenters' responses to the children's different types of "help-eliciting" utterances. These analyses (Table 6.17) addressed the question of how differently the two experimenters may have responded to the girls' and boys' direct and indirect requests for assistance, both *puzzle-directed* and *self-directed*. (*Experimenter-directed* HEUs were too infrequent to conduct any statistical analysis). It was thought that since the *orientation* of a speech act might colour the meaning of a child's utterance (Section 5.3.4) it would be of interest whether the experimenters' sensitivity to the orientation of children's speech acts might have affected their responses.

The combinations under consideration were the experimenters' neutral responses (pooled) and the re-focusing utterances made in response to their HEUs. The sub-categories "attention" and "new piece" were not included since they did not specifically occur as responses to HEUs. The "re-focusing" sub-category which did occur with any regularity was "puzzle-piece/place" (the re-directing of a child's attention to a new part of the puzzle or a new piece, in order to overcome a distraction or impasse. The only remaining refocusing utterance which *ever* occurred as a response to an HEU was "observation/point-out" (an offer of information relevant to solving the puzzle).

With regard to the children's *puzzle-directed* HEUs, these three types of experimenter responses yielded a high degree of consistency, both across the two experimenters and the gender groups. The only trend observed, occurred in the utterance of neutral comments made in response to HEUs. A slight, non-significant difference emerged between the two experimenters when interacting with the girls in the study ($z=-1.87$, $p=0.06$).

Similar inter and intra-experimenter consistency occurred in the responses to the children's *self-directed* HEUs. One exception was the male experimenter findings regarding neutral responses to *self-directed* HEUs, where more were made in response to the girls' than the boys (median .05 and .00 respectively, $p\leq.05$). Generally no trends seemed to appear for the two refocusing categories.

Table 6.17 Sequential data analyses for experimenter behaviour (male & female) across gender of children. Comparison using Wilcoxon signed rank and Mann-Whitney U tests.

		Male Experimenter	Female Experimenter	Experimenter Gender Wilcoxon Test	
				z-value	p-value
Omission of positives following correct placement	Girls				
	Median	0.25	0.18	-0.77	0.44
	Range	1.32	2.96		
	Boys				
	Median	0.22	0.44	-1.78	0.08
	Range	0.57	2.00		
Child Gender	U-value	74.00	71.00		
Mann-Whitney U	p-value	0.60	0.74		
RESPONSES TO PUZZLE-DIRECTED HELP-ELICITING UTTERANCES					
Neutrals	Girls				
	Median	0.38	0.27	-1.54	0.12
	Range	2.00	1.08		
	Boys				
	Median	0.27	0.09	-1.87	0.06
	Range	1.86	1.02		
Child Gender	U-value	72.00	57.00		
Mann-Whitney U	p-value	0.53	0.25		
Puzzle-piece/ place	Girls				
	Median	0.00	0.00	-0.73	0.47
	Range	0.17	0.18		
	Boys				
	Median	0.00	0.00	-0.37	0.72
	Range	0.32	0.23		
Child Gender	U-value	83.50	74.00		
Mann-Whitney U	p-value	0.96	0.83		
Observation/ point-out	Girls				
	Median	0.00	0.00	-1.07	0.29
	Range	0.18	0.27		
	Boys				
	Median	0.00	0.00	-0.45	0.65
	Range	0.23	0.12		
Child Gender	U-value	83.50	61.00		
Mann-Whitney U	p-value	0.96	0.17		(cont.)

Table 6.17 Sequential data analyses for experimenter behaviour (male & female) (cont.) across gender of children. Comparison using Wilcoxon signed rank and Mann-Whitney U tests.

RESPONSES TO SELF-DIRECTED HELP-ELICITING UTTERANCES						
		Male Experimenter	Female Experimenter	Experimenter Gender Wilcoxon Test		
				z-value	p-value	
Neutral	Girls	Median	0.05	0.00	-1.57	0.12
		Range	1.00	0.44		
	Boys	Median	0.00	0.00	-0.94	0.35
		Range	0.41	0.46		
	Child Gender	U-value	48.00	69.00		
	Mann-Whitney U	p-value	0.05	0.56		
Puzzle-piece/place	Girls	Median	0.00	0.00	0.00	1.00
		Range	0.25	0.12		
	Boys	Median	0.00	0.00	-0.57	0.61
		Range	1.00	0.30		
	Child Gender	U-value	78.00	68.00		
	Mann-Whitney U	p-value	0.65	0.51		
Observation/point-out	Girls	Median	0.00	0.00	-1.00	0.32
		Range	0.13	0.16		
	Boys	Median	0.00	0.00	0.00	1.00
		Range	0.19	0.13		
	Child Gender	U-value	78.00	69.00		
	Mann-Whitney U	p-value	0.58	0.49		

6.10.4 Correlational analyses between child and experimenter behaviour

A final set of analyses undertaken in the examination of experimenter behaviours for this study explored the possible connections that might exist between the children (across communication style and task-ability) and the experimenters' style of interaction. Specifically, was there any discernible relationship between children's

level of "help-eliciting" or their problem-solving speed and the degree of "helping" behaviour provided by the experimenters? The spectrum of possible "helping" behaviours was reflected in the sub-categories of "re-focusing." "puzzle-piece/place" was the only sub-category with enough data to conduct correlation tests. Therefore the other sub-categories were collapsed into this one central measure. The results reported below pertain to this overall category and its relationship to the children's overall HEUs and the two main orientation sub-categories, *puzzle-directed* and *self-directed*. Finally, the correlations between experimenter re-focusing and children's solving time is reported.

No significant relationships appear between the children's total HEU scores and the experimenters amount of re-focusing utterances. This was the case for both experimenters across both girls and boys. Overall, it seems that neither experimenter was increasing the number of these utterances (consisting mainly of marginally helpful *puzzle-piece/place* responses) as the children's "help-eliciting" utterances increased.

This was also the case for *puzzle-directed* HEUs in particular, although a significant correlation did appear between the male experimenter's re-focusing utterances and the boys' level of *self-directed* HEUs ($Rho=.76, p\leq 0.01$). A plausible explanation might be that the experimenter was influenced by the possibility (suggested by Study 1 findings) that the boys' "help-eliciting" had reflected actual difficulty encountered on the puzzle to a greater extent than the girls'.

With regard to the connection between the children's solving speed (task-ability) and experimenters' refocusing utterances, there were sizeable correlations for both experimenters, but only among the boys in this study. This was statistically significant for the male experimenter ($Rho=.79, p\leq 0.01$) and showed a non-significant trend for the female experimenter ($Rho=.53, p\leq 0.06$). This finding was not particularly surprising considering the likelihood of needing to re-focus a child who is having more difficulty. Why the relationship should occur among the boys and not the girls however, is more difficult to determine.

CHAPTER 7 DISCUSSION AND CONCLUSIONS FOR STUDIES 1 AND 2

7.1 Review of research questions

In these studies the main aim has been to identify any gender differences in help-eliciting behaviour and other verbal behaviours and to evaluate the relationship that this spontaneous task-related communication may have with the children's progress and overall performance on a challenging problem-solving task. The studies have focused specifically on help-eliciting behaviour in this context, because this area of behaviour may represent an important, yet elusive link between the what is known about language development on the one hand and various gender differences (particularly social behaviour) on the other. Although the research in both of these areas is enormously diverse, there are some central themes which, in the recent past, have predominated. These can be summarised as follows:

- Children's language goes through identifiable transitions which are generally described as a move from the simple and concrete, with mainly literal usage, to the more complex and abstract, with greater use of figurative language including the use of metaphor, analogy and irony (Ervin-Tripp, 1977; Bates, 1976). In the Piagetian tradition, this is usually conceived of as a sequential and innate progression, initially constrained by a cognitively based egocentrism (with which it develops in parallel), that later, as part of the child's developing theory of mind and interaction with his/her environment, culminates with the acquisition of mature language use with all its linguistic flexibility and pragmatic capabilities.
- For very young children, language (as conceived above) will be a relatively rudimentary communication tool that in each context of use will be quite literal and of limited complexity. From this follows the assumption that when we hear very young children speaking, the "speaker meaning" (Searle, 1971) will have a direct and literal connection with what they are referring to, what they are asking for or to whom they are speaking.

- Some main areas where gender differences in communication seem to emerge are in the *expression* of confidence, locus of control and "help-seeking," particularly in problem-solving contexts. In the research literature, the predominant generalisation is that girls appear to have less confidence and less internal locus of control, whilst having greater social motivation, which according to some researchers (e.g. Brem and Johnson, 1989; Deaux and Emswiller, 1974), occurs at the expense of task-achievement. These generalisations often derive from the study of verbal behaviour (e.g. self-reporting, interviews, naturalistic observation) or from observed task persistence or post-test achievement expectation. Few however, make use of spontaneously occurring language that emerges within the flow of problem-solving behaviour.

As discussed in Chapter 2, there are several underlying assumptions within these general concepts which have been subsequently questioned; and in many cases compelling research evidence has been offered which forces a re-examination of how we look at language and social development along with gender as an important variable within these (Leaper, 1991; Eccles, Kaczala and Meece, 1982). This study has been undertaken to examine communicative behaviour in a context (formal problem-solving) which may represent an important intersection between these various assumptions. The central questions raised were:

- Can evidence be found for gender differences in the way children express themselves in a challenging task, even at 3 - 5 years of age? This was explored in relation to linguistic structure, orientation and particularly the mode of self-presentation ("help-eliciting" or "neutral/self-reliant") within a speech act.
- If significant gender differences of the type above do present themselves, what will be their relationship to performance on the problem-solving task?
- Is task-related communication (particularly help-eliciting) at the preschool level primarily literal, as the literature would suggest; and is it therefore a straightforward reflection of the children's confidence and ability? Will these findings support the conventionally held beliefs about gender differences?

While the gender of the sample of children was the main independent variable being examined in this communication study, the possible effects of experimenter gender

and behaviour were also evaluated. As described, the study was conducted using a standardised set of behaviours, which was in effect during any contact with the nursery children. However, one must acknowledge the possibility of unexpected and unintentional effects which may be a function of either the gender of the experimenter or his/her way of interacting with the children. In conducting these two additional analyses the following issues were addressed:

- Is experimenter gender per se (as opposed to gender-stereotypical behaviour) a mediating variable in the way children express themselves in this context?
- Are there any systematic patterns of behaviour (bias) toward particular groups of children (e.g. male vs. female, quick vs. slow) which occur in spite of attempts to standardise the verbal and non-verbal behaviours of the experimenters?
- Can any possible biases partially or fully explain effects found in children's communication patterns in Study 1?

7.2 Performance and main gender effects

No substantial performance differences were observed between boys and girls in the puzzle-solving task. The only notable inter-group difference was across ages, where the younger age group proved to be slightly slower in solving the puzzle, as one might expect. Yet in spite of this parity in solving performance, the girls were observed to be using far more utterances which were classified as being help-eliciting. This is the first anomaly which needs to be considered and for which explanations need to be offered. As reported in the results chapter, in all four of the main HEU categories, the girls' scores exceeded those of the boys and in two were statistically significant. Their significantly different *composite* HEU scores dramatically amplified this effect. In contrast, the boys' "neutral/self-reliant" scores in the two main categories were greater than the girls' and were statistically significant in one (*puzzle-directed*, declarative). This effect is also reflected in their composite scores which significantly exceed those of the girls.

This first level of findings raises a chronic issue which exists in most of the research which attempts to examine the concepts of confidence, self-reliance and self-presentation. The girls in this study were clearly using far more utterances which, as

they are defined in this study, would fall into the negative spectrum of self-presentation. The classifications used for this study, particularly "help-eliciting," are based upon natural language¹ as it is used and understood in everyday interactions. As described in Chapter 5, the term "HEU" is a contextualised definition based on the speech act's meaning-effect (perlocutionary force) upon an adult listener. Using these "natural" definitions, females were observed to be more often self-effacing and more often overtly help-eliciting. On this level alone these findings would give one a very distinct impression that the girls in this sample, albeit of equal ability and performance, were lacking in confidence or achievement expectation. This is what traditional research has concluded when faced with these sorts of behaviours. However, as conceded in much of this research, it is impossible to be certain of such conclusions without some direct self-reflection on the part of the children, which is very problematic for this age group or some reliable measure of actual confidence or achievement expectation.

With older subject samples, one can of course interview each subject either before or after an experimental problem-solving task and ask them to reflect upon a pre- or post test, or on their overall confidence. This approach has been used in a number of studies (e.g. Hill and Dusek, 1969; Entwistle and Baker, 1983; Skaalvik, 1990), using a variety of contexts. If there are gender differences in actual confidence, which these studies suggest but they derive their findings from the study of *older* subjects, one might argue that the issue "innate versus acquired" is effectively lost to discussion. This is because during the years of development any innate predispositions and social learning factors have become permanently entwined and even mutually reinforced.

This is not to claim that studying behaviour at preschool ages will allow conclusions regarding root causes of gender differences; at far earlier ages social learning has taken place across several dimensions of behaviour, including gender-specific behaviours. For this research the earliest ages that could be *practically* studied (considering the design intentions) were chosen in order to be able to speak to the issue of observer interpretation and possible bias, expectational feedback and self-fulfilling prophesy. Thus, the earlier one can identify significant behaviour differences, especially ones that

¹ Use of the term "natural language" is not used here in relation to innateness (Chomsky) or as used by Grice (1957) for whom it meant purely literal and denotative. Rather, it is meant as simply "normal" or "naturalistic" language.

are conventionally associated with performance, the more effectively one can address the issue of reinforced expectations and confidence.

7.3 Performance and help-eliciting utterances: evidence for indirect, socially facilitating language among preschool girls.

In this study there was more help-eliciting behaviour among females, in spite of their being on a par with the males in task performance. In earlier work this trend had generated some important further questions: do those children (male or female) who frequently use HEUs represent a distinguishable sub-group of the sample? Are they generally the slower performers? The correlational analyses, as reported in Chapter 6, were designed to answer these questions. What was found was surprising and may begin to explain why the girls in this study could have significantly higher HEU use, whilst achieving parity with the boys on the problem-task. In the correlational analysis of the children's composite HEU scores, it was found that among the girls, solving time (using data which controlled for verbosity) did not predict in any way their level of help-eliciting. This finding may have an important link with the findings for the follow-up comparisons between Study 1 data and Pilot Study data. Girls in the easier puzzle condition used significantly *more* HEUs than girls solving the more difficult puzzle, whereas among the boys no difference emerged.

A markedly different picture emerged among the boys in this study. Among the boys, help-eliciting utterances *increased* significantly with their solving time. It was of particular interest that in the orientation sub-category of "self-directed" help-eliciting utterances (e.g. "I can't do this one"), there was a highly significant positive correlation with solving time among the boys, yet a weak negative correlation among the girls. It is the *boys'* pattern of behaviour which fits our conventional model of task-related behaviour. It is a "common-sense" view of problem-solving to assume that the more a child says things which connote a need or desire for assistance, the more difficult they are finding the problem. This is especially true considering the widely held beliefs about the age at which one can expect children to begin regularly using non-literal or ironic language, "non-conventional implicature" as put by Grice (1957). The children's neutral/self-reliant utterances, like the HEU data, had to be interpreted carefully with regard to its relationship with solving time. Overall both boys' and girls' correlations with solving time were non-significant.

The findings for female use of help-eliciting behaviours point to a possible source of systematic observer bias. The frequency results as discussed above, describe behaviour which fails to reflect actual performance. The subsequent correlational analysis, however, seems to show that not only does female HEU use fail to predict slower performance, but for some girls it actually predicts faster performance, thereby making the observer bias issue even more salient. As proposed in Section 6.5.1, there may be, at preschool ages, greater diversity among girls with regard to communicative behaviour in a challenging problem-solving situation. Recalling the correlation values across the different types of data, their Rho values fluctuated far more than the boys, and generally indicated non-significant *negative correlations* with solving time. A sizable number of girls *increase* their use of "help-eliciting" when finding the puzzle particularly easy. For boys no counter-intuitive patterns like this appeared. It is difficult to predict whether adults hearing language in a problem-solving situation will form impressions based upon an absolute level of help-seeking or on the help-seeking intuitively perceived as a proportion of everything the children say.

One is left with the problem of understanding the communicative purposes behind the girls' use of help-eliciting utterances. It is a two-part problem, one being *what* the motivation may be, if not to elicit help; the other is whether or not the underlying motivation is intentional. (There is some debate in the linguistics literature about the necessity of intentionality within pragmatic theory).

The functional effect that help-eliciting utterances can be expected to have, is to engage and to involve the person at hand, in this case an adult. Thus as communication it is by definition a social activity. To view the girls' use of HEUs in this study this way, compels one to consider help-eliciting as having a dual purpose. However, one might conceive of this "dual purpose" as a set of shifting priorities. At some level of task difficulty or urgency, "help-eliciting" must have a purely problem-solving function. No one would consider, for example, that calling the fire brigade for assistance would also serve as a bit of socialising. This was the point that the comparison of the Pilot Study and Study 1 data can partially illustrate. It appeared that when not cognitively over-stressed by a task, the girls readily increased their interaction with the adult at hand, through their help-eliciting. However, in a problem-solving setting, such as used in this study, the distinction for the child between solving a problem and being social may be very fine, particularly so for the girls. This "social facilitation" model of help-eliciting, as opposed to one presuming gender differences in

confidence and achievement expectation, concurs with recent research which critically assesses traditional assumptions regarding task motivation, persistence and achievement motivation (Leaper, 1991; Jacklin, 1989; Maccoby, 1990).

Taking the view that help-eliciting may be used in an indirect, social way and in this context occurred more among the girls, implies there was indeed greater female social motivation in this experimental setting. In this study there were other behaviours observed which appear to support this hypothesis, albeit in a circumstantial way. An independent verbal behaviour category in the coding system accounted for utterances which were cooperative or collaborative linguistic constructions. These included any speech act formed with the words "we" or "us" (an utterance incorporating the phrase "you and I" would also have been coded as a collaborative construction, though this never occurred). The findings regarding these sorts of utterances are relatively dramatic, yet remain problematic. The use of collaborative expressions occurred primarily among females, though overall use was infrequent. This seems to strongly suggest a greater social motivation among the girls. However, this finding must be considered carefully as there can be more than one explanation. While suggesting greater fundamental social motivation, such expressions may also represent a more mature and sophisticated use of language. As one facet of cognitive development, language is widely considered to provide a dependable and significant example of more rapid female development (Harris, 1977; Schachter, 1978; Ramer, 1976; Nelson, 1973). It was found in this study that girls who did use collaborative constructions represented a sub-group with faster solving times than other children, although one can only speculate about connections between these two dimensions of cognitive ability.

However, one link between social motivation and observed help-eliciting may lie in the relationship between the collaborative constructions and composite HEU scores. The children (male and female), who used collaborative constructions, represented a fairly small sub-set of the total sample. In spite of this however, there was a highly significant positive correlation between the frequency of their help-eliciting (as a proportion of total utterances) and use of collaborative constructions (Section 6.2.6). This finding might suggest that being linguistically collaborative may be connected in some way with using help-eliciting as a social device. However, this must remain a very tentative suggestion, because in this study, the behaviour of using constructions with "we" and "us" overall, was rather infrequent. Statistical analysis could be

conducted on only ten sets of scores; therefore, these results, particularly as correlational scores, must be viewed with caution. Individual differences in this category, as in many, were great, as one might expect in a study of preschoolers' communication style. A direct functional connection between use of collaborative speech acts and HEUs is likely to be highly contingent upon the child's individual style, the problem task and any number of other unpredictable factors.

The findings concerning "hedging statements" did provide another indication that at least linguistically, the girls were indeed behaving in a more socially facilitating way. This expressed itself in a statistically significant way in Study 2 and as a non-significant trend in Study 1. Less a "confidence" issue than a social one, there is wide consensus that these are pragmatic verbal devices which serve a social end and are part of a repertoire of verbal behaviours which minimises assertion of power and maximises negotiation and rapport (e.g. Lakoff, 1975; Sheldon, 1990; Tannen, 1993).

7.4 Pro-social language

The broad research base supporting a model of early pragmatic development, along with gender related styles of interaction and differing levels of social motivation, in all provide a supportive framework to allow one to propose an account of help-eliciting as a linguistic social device. This may be more complex than simply behaviour which is attention-seeking. Attention-seeking in its many forms is a fundamental survival mechanism which appears at birth (in most mammals) and is essential for eliciting basic parental care. Help-seeking in verbal form no doubt can be used for this purpose as well. However, "help-eliciting" in this thesis is proposed as a behaviour which may represent early development towards understanding of language as a more abstract realm of social interaction, as opposed to language as a tool for more concrete needs. By offering this interpretation of some help-eliciting, it is suggested that the children, particularly the girls in these studies, were able to attend to the social needs of the situation (prevention of awkward silences, initiation and maintenance of conversation, etc.), in spite of its overt formality. These are communication skills which are expected of most adults, but far less so of preschool children, especially when such skills may manifest themselves through language which is sensitive to the social constraints of the problem-solving context.

7.5 Discussion of Study 2: effects of experimenter gender and experimenter behaviour analysis

The second study, which explored the issue of experimenter-gender, yielded only subtle differences in the communicative behaviour of the children. Generally speaking, neither the boys nor the girls significantly increased or decreased their use of HEUs, N/SRUs or collaborative expressions when in the presence of the female experimenter. This suggests that gender of the adult interlocutor may not be a crucial factor, at least in this context and age group of children. The study functioned partly as a means of testing the robustness of the Study 1 findings, to determine if the significant effects found may have, in some way, been a direct result of using a male experimenter. It was not within the scope of the study to undertake an exploration of the effects of *stereotypically* adult female and male interactional style. This would be of great interest for future research and will require an entirely different experimental design presumably using naive adult subjects and children interacting in a problem-solving context.

Although behaviours observed in the male and female conditions of Study 2 were more similar than different, the frequency of the children's (girls and boys) help-eliciting utterances was mildly accentuated in the female condition. This concurs with available research on early childhood preferences in seeking help from female peers and adults (Northman, 1978). The findings also suggest (in view of the standardised experimental procedure) that the HEU scores obtained with the female experimenter may be the least that one can expect, since the standardised experimental procedure may have actually *minimised* typical "female interaction" which arguably would reinforce "social help-eliciting." However, this latter observation remains extremely conjectural and would require further examination.

Whilst the gender of the two experimenters did not appear to heavily influence the children's behaviour, particularly their help-eliciting, it was of interest to examine the variation in interactive style which may have emerged between the experimenters, in spite of a standardised verbal routine. Moreover this analysis addressed the question of whether either experimenter interacted differently with the girls and boys. Was either experimenter more encouraging (or discouraging) to one group or the other? Did either the girls or the boys receive more re-focusing thereby being more subtly directed to succeed on the puzzle?

These are questions that are likely to have yielded interesting and unpredictable answers had the study been one that observed *many* adult-child problem-solving dyads, behaving in natural and spontaneous ways. It appears that the behaviour of the two experimenters in this study did operate within a relatively high degree of standardisation, minimising to a large extent, possible variation in the way either experimenter might have responded to the girls versus the boys. With regard to direct responses to the children, only one comparison yielded a significant difference. This occurred between the number of neutral responses to self-directed HEUs (a sequential "event") uttered to the girls vs. the boys, by the male experimenter. That is to say, the male experimenter seems to have responded to the girls' self-directed HEUs with a neutral comment or question (e.g. "hmmm," "What do you think?," etc.) more than to the boys'. This however, was the only significant difference which emerged in either experimenter's interactions with the girls and the boys.

Although there was high consistency across gender of child, a few differences between the experimenters appeared which seemed to reflect stylistic differences in interaction. These differences tended to be of a *quantitative* nature rather than qualitative. That is to say, they were very similar in the sorts of things that were said to the children (as per the experimental design of Study 2) but they differed in frequency on a number of measures.

One conspicuous difference, as reported in Chapter 6, was the higher number of "neutrals" and in particular, "non-committals" uttered by the male experimenter. One possible explanation for this difference emerging only from interaction with the girls, is that the male experimenter's responses may have been a function of the girls' far greater help-eliciting. It was known by the researchers at this point that the girls were displaying more help-eliciting behaviour whilst clearly handling the problem-task competently and enthusiastically. This knowledge may have been an influencing factor. One can speculate whether this difference is, in any way, connected with the slightly greater number of "positives" used to the boys by the male experimenter. It is possible that some sort of unconscious compensation was occurring with the knowledge that the boys' (with whom the experimenter-difference was statistically significant) help-eliciting had a more "conventional" and straight-forward relationship with how difficult they found the puzzle. Thus boys appearing to need more help might receive greater positive encouragement. Less familiarity with the Study 1

findings may explain why this pattern did not occur with the data collected by the female experimenter.

Another statistically significant difference which occurred between the two experimenters was with regard to "negative" utterances overall, whereby more were observed for the female experimenter. This finding is difficult to interpret, because these types of utterances occurred extremely infrequently in any form. As mentioned in the results chapter, there were *no* occurrences of "negative-ability" or "negative-progress" utterances. (Indeed, these would be rather harsh things to say in this setting.) The other sub-categories of "negative-disaffirmations" (e.g. "no, I guess not there...") and "negative-questions" (e.g. "does that go there?") both had median scores of zero. These examples capture the character of these utterances; when they occurred they most likely reflect a stylistic difference between the two experimenters. The tone of these expressions seemed to have been *negotiative* and supportive rather than proscriptive in any way.

The only other substantive difference between the two experimenters was their use of collaborative expressions. These were analysed mainly because such utterances were uncommon and conspicuously limited to the girls' communication. The possibility that these occurred as imitative behaviours in response to one or the other experimenter's behaviour was considered. Surprisingly, the *male experimenter* turned out to use these expressions significantly more than the female experimenter. However a connection between this difference and the collaborative utterances used by the children, did not emerge.

7.6 Social motivation versus achievement motivation: evidence for compatibility

As reviewed in Chapter 2, the recent literature on achievement expectation and confidence, along with locus of control and helplessness, reflects a growing distrust of conventional ideas about gender differences in these areas. As suggested by the findings in this study, what may also represent an insupportable gender-related assumption is the widely held belief that *social motivation* and *achievement motivation* are generally competing drives and that females by nature or learning opt for the former and sacrifice the latter. Few studies now explicitly or even intentionally claim that social motivation will express itself at the expense of achievement motivation.

However, many studies have demonstrated higher social motivation among females; and the diversity of approaches and the relative consistency of the findings, have made it a widely accepted, if not clearly defined, gender difference.

In this research the predominant findings can be summed up within the familiar set of qualitative descriptions for female social interaction such as affiliative, deferential, negotiative, collaborative, etc.; whereas male social interaction can be described as individualistic and instrumental. The conventional wisdom appears to be that "achievement motivation" and such things as competitiveness and individualism, are all somehow part of the same system attributed to "maleness." As described in Chapter 2, this is an assumption that this study was intended to assess indirectly. There were several indications that the girls in this study were indeed behaving in a more social way, *not* including all the engaging utterances classified as "help-eliciting." They verbally engaged the experimenter more through their "experimenter-directed" utterances. In addition, they spoke about themselves more in the context of the puzzle-task as evidenced by their greater self-directed utterances. Thus, at least within the grammatically defined categories, they were more self-disclosing, which in the literature has been identified as one essential part of establishing social rapport (Tannen, 1993; Coates, 1993). Finally, as discussed above, the use of collaborative constructions, which in a literal way implies joint participation, was predominantly a female behaviour. Though reinforcing the "greater female social motivation" model, these behaviours all occurred whilst the girls were managing to handle a challenging problem-solving task with as much achievement motivation as the boys (claiming otherwise would necessitate that they did not need to try as hard, to do as well.) The picture observed here makes it very difficult to describe "achievement" and "sociability" as adversarial motivations. No differences could be detected between boys' and girls' performance and ability, nor were there more girls unable or unwilling to finish the puzzle. As described in Chapter 6, all the children responded to the experimental setting and the puzzle-task in particular, with equal amounts of drive and enthusiasm.

7.7 Concluding remarks for Studies 1 and 2 and suggestions for further research

As operationalised in the coding system developed for this study, communicative behaviours in a formal task setting were observed and classified according to their normal, everyday production. The categories of hedging statements, tag questions, collaborative expressions and, most importantly, "help-eliciting utterances" were all studied in relation to contextualised, "listener-based" interpretations. This is to say that task-related verbal behaviours were identified which would have predictable effects upon an adult listener in such a setting. Thus "HEUs" were so-called because of their expected subjective interpretation by an adult.

The work of Lakoff (1975), Coates (1993), Leaper (1991), Newcombe and Arnkoff (1979) and others has established links between deferential, affiliative and compliant language use and listener interpretations of lesser competence, lower status and lower assertiveness. "Help-eliciting" utterances as defined in this thesis may also represent another facet of "gendered-talk" which is occurring among children at an age when many researchers and lay observers would not expect such subtle, sophisticated use of language (even if it proved to be unintentional).

The findings in this study raise the issue of observer bias, which itself is a field with enormous breadth and has provided compelling evidence for evaluative feedback systems and self-fulfilling prophesy. Little research has examined the effects that help-seeking behaviour may have upon naive adult evaluation of task ability, although there has been research concerned with related areas, such as perceived ability and compliance (Gold, Crombie and Noble, 1987). The style of language used by the girls in this study encompassed in the finding regarding the orientation of speech acts, collaborative expressions and "help-eliciting" fits the gendered-talk pattern as being deferential, indirect and negotiative. It did not however, predict poorer performance (and by implication, *motivation* to achieve). Additional research (Study 3) is needed to determine if there is reason to believe that greater help-eliciting will negatively affect adult perception of ability. As argued by Tannen (1993), this a deferential style of interaction (which includes many aspects of language use) "is not in itself a strategy of subordination" (or in this context, subordinated achievement motivation). She continues by saying: "Rather, it can be used by either the powerful or the powerless. The interpretation of a given utterance and the likely response to it depends on the

setting, on individuals' status and their relationship to each other and also on the linguistic conventions that are ritualised in the cultural context." (p. 175)

It is hypothesised that the setting and the "individuals' status" in this study might possibly contribute to rather disparaging opinions of the speaker's ability and performance. This required a further study which is described in Chapter 8, which explored "help-eliciting" as a possible style of communication and its interpretation by adult observers.

CHAPTER 8 COMMUNICATION STYLE AS A FACTOR IN ADULT ASSESSMENT OF CHILDREN'S PROBLEM-SOLVING ABILITY

8.1 Aims of Study 3

The findings of Studies 1 and 2 occurred in a setting which can be considered to have a parallel in most children's educational settings. These "real-world" settings could be described as any context whereby children would be expected to work individually on a problem-task, which could have a variety of forms¹. Thus the experimental context which was used in Studies 1 and 2, was intended to reflect actual contexts of education. What was observed in the work with the nursery children was distinct communicative differences between the males and females. These appeared to manifest themselves most clearly within ostensibly task-oriented "help-eliciting" behaviours. As proposed in Chapter 7, these patterns (both the frequency data and correlations) may reflect a rather subtle facet of earlier female linguistic maturity and social motivation.

Overall, the girls in Studies 1 and 2 appeared to behave in more socially facilitating ways. This interpretation was based upon the fact that their level of "help-eliciting" was higher than the boys and was not predicted in any way by the difficulty they encountered on the puzzle. Among the boys, in contrast, "help-eliciting" increased significantly with longer solving times. This interpretation was also based on the girls' greater use of *experimenter-directed* utterances (the vast majority of which explicitly invited experimenter assistance) and their virtually exclusive use of collaborative expressions. These findings seem to concur with much of the research concerning gender and interactive style, as discussed in Chapters 2 and 7. Within this literature there is very little to suggest that socially facilitating language use in general (i.e. in non-formal task settings) is perceived in a negative light. One notable exception is the research which has indicated that deferential language use, such as hedges and tag

¹ Children, from nursery onwards, are expected to work independently on some activities. "Individual achievement" is a theme which might be described as permeating all levels of education and culminates in the familiar forms of formal assessment and standardised testing.

questions, is linked with lower perceived assertiveness (Lakoff 1975, Newcombe and Arnkoff, 1979).

Concepts and terminology such as "*interactive style*" are frequently used (e.g. Tannen, 1993; Sheldon, 1990) in a way which creates an ambiguous impression of *consciousness* and *intentionality*. In much of the literature there is an attempt to steer clear of speculation regarding root causes of gender differences. The findings of this research serve to *describe* some robust and early gender differences in task-related communication. However, this research must also only offer speculation as to whether or not these differences in "styles" are consciously used. At least on a surface level, "style" might indeed be the appropriate word to describe an inclination to use "help-eliciting" as a social device. Using this functional definition, the generalised behaviour of "help-eliciting" was singled out as an aspect of interactive style and for this further study was manipulated as the main independent variable.

"help-eliciting", as a possible facet of "style," became the focus of study because, of the various speech act categories examined, HEUs seemed to have the greatest potential for having a negative impact on listener-interpretation. Depending on the context (as always) a child's request for help or implication of need, if not recognised as some other (social) device, might be expected to create an impression based on its literal content. The dyadic problem-solving setting used in this work was one which had very limited social richness, which may (in real-life interactions) further work to establish an expectation on the part of a naive observer: that verbal behaviours will indeed be related to progress on the problem itself. These hypotheses and assumptions are all concerns which helped shape the methodology of the main study and, particularly, the coding system. Therefore, the study described in this chapter is an essential follow-up, with which to tests the hypothesis that the communicative differences manifested in the children's "help-eliciting" behaviour may in fact influence naive observers' evaluations of ability. It also serves to help validate the contextualised definitions which formed the coding system, described in Chapter 5.

8.2 Theoretical overview

As discussed earlier in this chapter, a main concern is to answer some of the central questions that were raised by the findings of Studies 1 and 2. In short, these are: Do the communicative differences (HEU use) that were identified have an influencing

effect upon adult subjects? If adult viewers appear to be influenced in their evaluations of performance, ability, skill and confidence, is this actually due to the level of HEU use as a facet of communicative style or more a manifestation of a simple gender bias?

Another important consideration, of course, is the individual characteristics of adults. It would seem extremely likely that there would be distinct individual differences in the level of influencing that might occur, which could be attributable to myriad interactions between context, personal background, age, gender, etc. Some researchers have explored this issue. Babad, Inbar and Rosenthal (1982) used self-report questionnaires to identify certain personality traits (dogmatic, autocratic, rigid, etc.) and found them to be linked with high-bias categories of subjects. The levels of bias were established by subjects' ratings of drawings by fictitious children of different ethnic and socio-economic backgrounds. This personality perspective with regard to the propensity to become biased was elaborated and confirmed in other studies by Babad and his associates (e.g. Babad, Inbar, Rosenthal, 1981; Babad, Bernieri and Rosenthal, 1989).

The area of positive and negative teacher bias and feedback has received a great deal of attention. Where teacher factors are discussed, they mainly centre around personality traits (e.g. Babad, Inbar and Rosenthal, 1982). However, there is very little research available that has formally investigated prior experience, whether informal or professional, as a factor in teacher expectancies and bias. Babad et al. (1987) did report differences between grade level of teachers, whereby the pre-school teachers were found to exhibit lower levels of negatively biased verbal and non-verbal feedback. Taylor (1979) conducted a study that examined racial and gender bias and possible interactions with perceived ability which was designed around teacher-trainee subjects. She reported behaviour (less academically demanding material use, less response opportunities, etc.) among teacher-trainees which reflected an interaction between race and *perceived* ability, with low ability black children receiving the least positive feedback. As reflected in her subject group, there is the consideration of training and teaching experience as an issue in adult bias, although there is no actual comparisons made with other groups of adults. Generally there does not appear to be much research which has examined either age or experience of teachers as mediating variables in susceptibility to bias.

Prior to commencing Study 3, these research questions were discussed with various nursery and primary school teachers. Most felt confident that the style of a child's communication, including help-seeking in various forms, would not be particularly influential on their overall opinion of the child's ability. As experienced parents and teachers, these people were aware to some extent of how bias can occur and be perpetuated. As asserted by most researchers in this area (e.g. Trevarthen 1992), the primary caregiver will be the most sensitive to the functional meaning of a child's utterance, because of their intimate understanding of that child's unique communication within various contexts. It is difficult to know how well the intersubjective quality of teacher-child interaction can compare to that of parent-child interaction. With regard to subjects attending to actual performance rather than style of communication, expectations among parents and teachers with whom the research was discussed were that little influencing by HEU level would occur. This study was intended to explore formally the role that *experience with children* may play in evaluation of various dimensions of task-ability.

Ideally, a full examination of adults' responses to potentially biasing information, such as HEU use, would investigate all the important variables that relate to context and particular attributes of the individual subjects. A study of contextual variables might include different types of problem-solving and associated communication (e.g. formal problems, unstructured play-based problems), along with different types of settings (e.g. dyadic, group, classroom based, home-based). A full consideration of individual subject variables should include a range of categories, such as age, educational level and socio-economic status along with experience and training. Such a comprehensive set of variables was not possible within the time-frame of this project. However, it seemed essential to address at least the issue of *experience with children*, as part of an examination of "help-eliciting" as a potentially influencing behaviour.

8.3 Subject selection

For the adult evaluation study, subjects were recruited from a local teacher training college. Although the findings of Studies 1 and 2 might be considered relevant to any caregiver of nursery aged children, a main concern which underlies this research is the issue of systematic bias in formal education. As asserted in the literature regarding parent-child interaction (Section 2.12), communicative behaviour seems to be produced and received on a more sensitive and objective level than in other types of

interaction (e.g. with short-term caregivers). Because of the benefit of extended contact through all contexts of interaction, parents can be expected to be the most sensitive to the functional meaning of their children's utterances. Thus, it seems less probable that some long-term system of bias would occur between parents and their children. For this reason, it was important to be able to work with people intent on careers in education and to place the study within the explicit context of education. It was hoped that this would allow a more focused and practical discussion of the results of the study.

To explore the concept of "experience," two independent groups of students were chosen. For the "inexperienced" group, students early in their first year of a four year undergraduate course (B.Ed.) were invited to participate in the study. There were 17 subjects who participated in the study, ranging in age from 18 to 31 with a mean age of 22 and were almost exclusively women (only 1 man from the "inexperienced" group participated in the study, resulting in a 16-1 ratio that approximately reflected the course enrolment). There were 19 participants in the "experienced" group of subjects, ranging in age from 24 to 41 with a mean age of 32. They consisted of professionals in fields which have a great deal of contact with children. They were employed primarily as teachers, though a sizable proportion were health care workers (nurses, physicians assistants) and social workers, all of whom were enrolled in a masters of education degree at the same college. As with the undergraduate participant, most were women (17 out of 19).

8.4 Stimulus material

The videotaped material from Study 1 provided the stimulus material for the adult-interpretation/evaluation study. The video-clips selected for this study were designed to test the effect of communicative style ("help-eliciting") upon observer interpretation. As reported in most gender research (e.g. Lakoff 1975, 1979; Coates, 1993), socially facilitating behaviour, such as using hedges and tags, greater sharing of "the floor" and other deferential communication is discussed as typically female behaviour, with particular effects on listener impressions. It was proposed in this research that "help-eliciting" may be another important facet of style which seems particularly visible among females. Therefore, it was necessary to be able to make a distinction between possible effects relating to gender of child per se (simple gender bias) and effects that may be due to the child's *style of communication* ("help-eliciting").

The design tested both *gender of child* and *help-eliciting* of child as distinct, yet possibly interacting, factors in adult evaluation. To do this, four video clips were selected, comprising two girls and two boys. They were of children who were all on a par with each other in terms of solving time (within 30 seconds) and age. Within each gender, two contrasting "help-eliciting" styles were represented, "high-HEU" and "low-HEU." Thus each combination of gender and HEU style was represented. The four stimulus clips were of identical length (3.5 minutes), showing the solving of the puzzle from start to finish in virtual real-time (i.e. the time taken to watch each clip approximates the time it took to actually solve each puzzle). The four clips consist of a boy with high-HEU use, a boy with low-HEU use, a girl with high HEU-use, and a girl with low-HEU use. These selections were made on the basis of the children's proportional level of "help-eliciting," which was their composite HEU score \div total utterances per minute. (Solving time was controlled for already since they were selected for approximately equal solving time.)

Pilot work had identified one area of difficulty in the selection and editing of the stimulus clips. This was the length of time per child during which viewers could be expected to concentrate without becoming tired or losing interest. An initial ambition was to be able to use the video clips in unedited, real-time form, in order to preserve and maximise their natural effect upon the viewer. Fortunately, the majority of the children's solving times lasted no longer than 3 - 5 minutes and major abridging of the clips was not necessary. However, because of the gender effects which presented themselves in Study 1 (comparatively high levels of "help-eliciting" *per minute as a proportion of total utterances*), it proved difficult to find candidate girls of low-HEU use, with moderate or low solving time. Therefore the primary difficulty was finding a sufficient number of clips of children, all of comparable performance and age, from which the necessary gender and HEU manipulations could be made. The final selection required some editing in order to make the on-task time of the four clips identical in length and matched for proportional HEU level within each pair of children. Since they were selected on the basis of being of comparable length and HEU level, this was accomplished by removing small portions (mainly off-task). Considerable care was taken in the editing process to avoid altering in any way the "flavour" of each solving session. Each clip pictured the child starting and finishing the puzzle, with minimal editing of their placement of individual pieces, so as to make each clip as close to "real-time" as possible.

The order in which the video-clips of the four children were presented to subjects was counter-balanced so as to avoid confounding order effects. Since there were four clips, there was a total of sixteen possible combinations in which to view the tapes. Showing the clips with the boys paired together and girls paired together was rejected because of the risk of making gender too salient an aspect for the participants. Similarly, pairing together similar HEU style children was rejected as it increased the salience of communicative style (HEU use) and thus the risk that subjects would realise the true aims of the study. In making a final decision the main concern was to avoid these pitfalls and to provide a viewing order which was as neutral as possible in terms of how the video-clips would be perceived as a series. What was decided upon was an order of presentation that would proceed as follows: First the low-HEU girl, followed by the high-HEU boy, the high-HEU girl and lastly the low-HEU boy. Half of the subjects viewed this presentation and the other half of the subjects viewed it in reverse order.

The edited clips were copied onto two video-cassettes, one for each of the presentation orders. A third video cassette had two segments of still pictures (5 minutes each) of all four children in a four-way matrix picture, which was labelled with a number for each child, representing the order in which they were viewed. This third tape of still pictures (see Figure 8.1) was used for the final follow-up comparison questionnaire at the end of the session. It was left playing in order to give the subjects a chance to refer to the children they were evaluating, thereby avoiding any mix-ups due to forgetting who was who, as they ranked them on the four questions.

Figure 8.1 Video stills for reference during completion of follow-up comparative questionnaire



8.5 Methods for Study 3: Subject recruitment, ethical considerations, experimental procedure and data collection.

8.5.1 Subject recruitment

In recruiting the "inexperienced" group, the study was briefly described by the researcher to students during one of their 1st year lectures, after which they were invited to sign-up for an experimental session. Involvement in the study took place during times that were coordinated with the students' free time between lectures. For the MA students ("experienced" group) the study was described to them by their lecturer whose tutorial time was kindly donated to the study and students were invited to participate. For both subject groups it was explained that the research was being conducted to study nursery children's problem-solving and that participants were being sought to provide feedback on how children seemed to cope with a challenging task, including their strategies and solving style. There was an obvious need to not disclose the precise nature of the study as this would quite likely result in self-conscious responses to the evaluation questionnaires. Neither the topic of gender differences nor communication style was mentioned. Short of revealing its aim as a study of adult interpretation of "help-eliciting," an attempt was made to describe the study as fully as possible in order to address the issue of informed consent. The experimental sessions were followed by extensive de-briefing discussions, which included a full description of the actual aims of the study. When seeking permission from the appropriate staff of the college, it was agreed that the research would be used in a constructive, educational way with the students (also see Appendix-Study 3). As such, the study, including all aspects of the findings, was incorporated into their tutorial time for the MA students. The B.Ed. students were invited to participate in a discussion following each experimental session. The students from both groups were also encouraged to provide feedback on any aspect of the study and to raise any issues that were important to them. Generally the study was well received by the students, who remarked quite positively on the findings and the experience of participating.

8.5.2 Questionnaires for examining adults' evaluation of children's problem-solving

Two sets of questionnaires were developed with the aim of acquiring an overall picture of the subjects' immediate and spontaneous impressions of each child. The first set of questionnaires (Appendix-Study 3) pertained to each individual child's problem-solving. Each subject was given one of the individual questionnaires to fill out after watching each clip. The questions (listed below) were intended to cover several areas of evaluation, relating to each child's work on the puzzle. These areas broadly related to the concepts of **Ability** and **Performance**, **Self-Reliance** and **Confidence**. These areas would allow some informed distinctions to be made in the analysis of the adults' overall subjective evaluations. In total there were five target questions (with two filler questions). As with most questionnaires, all of the target questions required wording which would elicit the desired information, without revealing the underlying interest in their subjective opinions.

Question 1: (<i>target question</i>)	"Did this puzzle seem appropriate for the child's level of ability?"
Question 2: (<i>filler question</i>)	"What sort of strategy did you feel the child used: visualising the whole picture or by fitting pieces by their individual shape?"
Question 3: (<i>filler question</i>)	"Did you feel this child has motor skills which are lower, higher or about average for this level of development?"
Question 4: (<i>target question</i>)	"Do you feel the child could have done with some extra help?"
Question 5: (<i>target question</i>)	How much confidence did the child seem to have in solving the puzzle?"
Question 6: (<i>target question</i>)	"How many correctly placed pieces seemed to occur by luck?"
Question 7: (<i>target question</i>)	"How independent did the child seem while working on the puzzle?"

Question 1 concerned the child's ability, though it does not openly ask the respondent to make a judgement of ability, but instead couches the question in terms of the

puzzle's "appropriateness." **Question 2**, a filler question, asked the respondents to provide their impressions of each child's solving strategy, within the spectrum ranging from visualisation of the entire picture, to reliance on individual shapes of pieces. **Question 3** was also a filler question, though with an evaluative tone. It required an estimate of relative motor ability for each child. The next target question, 4 was intended to elicit a belief about the child's performance on this particular problem-task, though avoiding a direct request for an evaluative judgement. **Question 5** was concerned with the viewers' beliefs about the child's confidence during the problem-solving session, whilst **Question 6** was intended to elicit belief about the level of skill involved for each child. This was covertly requested by asking for subjects' opinion regarding the role of luck in each child's solving session. Lastly, **Question 7** was intended to elicit the respondents' beliefs about self-reliance by asking how independently each child seemed to work on the puzzle. For each question, respondents were asked to express their beliefs by circling one number on a seven point scale. These were arranged so that the high point of each scale always corresponded to the greater amount or degree of what was being considered. However, the questions were worded so as to avoid having the more negative responses always corresponding to the lower numbers of the scale. For example, **Question 1** read: "Did this puzzle seem appropriate to the child's level of ability?" with possible responses ranging from 1 (too easy) to 7 (too hard). Two of the seven questions were included simply as "filler questions" which were designed to lessen the evaluative tone of the questionnaire with regard to communication. These two filler questions asked subjects to make a judgement about the children's apparent strategies and degree of motor coordination, whilst solving the puzzle.

The second set of questionnaires (Appendix Study 3) served as a final comparative follow-up to the subjects' responses to each individual child. After viewing all four clips and filling in the individual questionnaires, the subjects were given four further questions which asked them to directly compare the children on similar issues as covered in the individual questionnaires. In each area they were asked to rank the four children from "least" to "most." The first question asked: "Which child seemed to need the least/most help from the experimenter?" The second question asked: "Which child seemed to have taken the least/most amount of time to solve the puzzle?" The third question asked, "Which child said the least/most things which implied they needed help?" The fourth question asked, "Which child seemed to have the least/most confidence in solving the puzzle?"

The subjects were not told in advance that they would be completing a follow-up comparison questionnaire, as this would partially reveal the intent of the study and undermine the goal of obtaining spontaneous, subjective answers. These follow-up questions, given out after all other responses had been collected, were intended to explicitly ask the subjects to make comparisons between the four children. They were also designed to serve as a means of cross-examining their beliefs expressed earlier in the other questionnaires. If any substantial intra-subject discrepancy appeared, this would require a re-designing of the individual questionnaires, particularly a re-assessment of what sorts of beliefs they were in fact eliciting. One last question included on the follow-up questionnaire was a free-response question which asked subjects to describe what they had considered to be the best indicator/s of ability for the children in this context. For this last response, they were encouraged to write brief notes to express any impressions created by the video-clips, which for them provided the best indications of "how well each child coped with the puzzle-task." This open-response question was included as a means of assessing, in a less formal, restricted way, what had become for the subjects the most salient features of the children's behaviours, with respect to how well they seemed to cope with the task.

8.5.3 Administrative procedure

The instructions given to the participants and the wording of each target question were designed to encourage them to provide spontaneous impressions, as opposed to prompting highly analytical, carefully thought-out evaluations. This was because the primary goal of the design was to re-create, as well as possible, a normal everyday-like observation that fostered an unself-conscious subjective impression. The overall procedure was designed to fulfil this aim. Upon arrival in the classroom that was used for showing the videotapes, each group of students was thanked for coming along and was told that as part of the research, there was an interest in getting feedback on children's problem-solving, from people who were actually in or training for, professions within education. It was explained that they would be watching four videotapes of nursery aged children working with the experimenter on a jigsaw puzzle; and after viewing each clip, they would fill in two short questionnaires asking for responses about how the children coped with the puzzle, their strategies, etc. The subjects were told that there were no right or wrong answers, but rather the intent was to get their overall spontaneous impressions of the solving sessions.

Information provided to the participants also included a description of the experimental procedure used in Studies 1 and 2, including the fact that all the children were shown the completed puzzle and discussed with the experimenter all aspects of the picture before tipping out the pieces and starting the puzzle. Thus, they were aware that none of the children had any particular advantage in solving the puzzle. They were told that the clips had been edited slightly in order to remove off-task portions, but that essentially what they would be viewing was the children's solving of the puzzle in real-time. In addition, the participants were told they could, at any time while filling in any of the individual questionnaires, go back to any of their previous ones and change their answers. This instruction was included because of feedback received in earlier pilot work for this study. Many subjects reported that it was very difficult to calibrate their responses until they had seen more than one child. Thus they frequently pointed out that once two or more children had been viewed, they would have liked to have been able to go back and modify their previous answers. Without this they felt their beliefs were misrepresented. Allowing revision of answers was decided to be of benefit, because it was likely to result in more balanced, conservative answers (thus further avoiding spurious order-related effects) and, as found in the pilot work, it lessened the desire to "try to make allowances" when responding to later individual questionnaires. These "automatic" comparisons observed in the pilot work also made more salient, the need for careful counterbalancing of the presentation order.

Considerable time was taken to explain how they were to use the scale in expressing their beliefs. For each question, the intended meaning of each point on the scale was described. Thus for example on **Question 1**, they were told that a "1" was appropriate if they believed that the puzzle was too easy and was thus below the child's solving ability. A response of four should be indicated if they believed the puzzle was just about right for the child, not too easy, challenging enough without being too difficult. Similar instructions were given for the other questions. One particular point made to the subjects was that responding with a "4" on any of the questions, which was the mid-point of the scale, should not be done to express either uncertainty or ambivalence, but rather a response which genuinely reflected a belief that was a balance of the two extremes represented. They were encouraged to ask for clarification on any question if they were uncertain about the meaning. They were instructed to leave blank any question they either did not want to answer or could not

answer. When the responses were collated, it was found that this only occurred on non-target questions (2 and 3) which are indeed questions whose answers are difficult to quantify. There were occasional questions raised to clarify the meaning of some of the target questions, which were straightforward and were easily explained.

For the follow-up comparative questionnaires, subjects were given instructions for filling out each response to the question. These instructions for the ranking of the children were also included on the questionnaire sheets. Besides simply ranking the four children on each dimension of behaviour, the subjects were told that if any two or more children were actually too close to make a distinction, then they should make a choice as best they could, but then circle the numbers of the children they thought were "too close to call." This would later help further inform the statistical analysis since this ranking process had a degree of "forced-choice."

8.5.4 Procedure for statistical analysis

Data collected from the two sets of questionnaires were entered into a computer software program (Statview SE + Graphics, 1988) for the statistical analysis. To test for within-subject differences across the four conditions (HEU/gender), Friedman non-parametric analyses of variance (one-way) were used, with Chi square values and p-values (probability) reported. Because ordinal scales were used to measure responses on the two sets of questionnaires, measures of central tendency are expressed as median values for each response set. For the testing of between group differences ("experienced" versus "inexperienced"), Mann-Whitney U tests were used with U-values and p-values reported.

For the individual questionnaires, the responses to each question were analysed independently, since each target question represented slightly different areas of assessment. As discussed earlier in this chapter, the questions were intended to elicit subjects' beliefs across the general areas of performance, ability, skill, confidence and self-reliance. A repeated measures design was used for the collection of data, whereby each subject would provide a response to each of the four children across the five target questions. The central aim in this analysis was to test the hypothesis that children's task-related "help-eliciting," as an integrated part of their social repertoire, would have a effect upon the evaluative beliefs of naive observers. By using a design which controlled for child-gender effects and by matching the children on real-time

solving performance, it was hoped that effects due to their HEU "style" could be assessed.

Post-hoc comparisons using Wilcoxon signed rank tests were conducted to examine the subjects' median scores across the different possible combinations of child pairs. It was hoped that this would provide clues as to the effect that both gender and HEU use had on the subjects of this study.

For the analysis described above, the data for both groups ("inexperienced" and "experienced") were pooled. However, for the purposes of exploring the variable of "experience," these two groups were compared by examining their respective median scores on each question, for each child. Thus for example, "experienced" and "inexperienced" subjects were compared on how they evaluated "ability" (Question 1) in a high-HEU boy, a low-HEU boy, a high-HEU girl and a low-HEU girl, all of whom were on a par with each other in actual performance (and identical in video-clip solving time). This was then repeated for each of the other target questions. A series of Mann-Whitney U tests, along with each group's median scores were used to make these comparisons.

The analysis of the follow-up questionnaires was statistically similar to that of the individual ones. A Friedman test was used to examine the serial order in which subjects had placed the four children. Thus each child's order (from "least" to "most") provided a numerical rank from 1 to 4, with which the statistical comparisons could be made. This provided a median rank for each child, for each comparison question.

In assessing subjects' answers to the free-response question, a content-analysis type approach was used. Several central themes were targeted as being relevant to their subjective beliefs about the child's work on the puzzle. These included any comments that pertained to perceived solving time, observations about their verbal behaviour, non-verbal communication (particularly eye-contact); and any comments relating to apparent strategies the children may have used. The subjects' feedback for this open-ended question was "sifted" to draw out these broad themes, so as to be able to approach the issue of salient factors for evaluation in a more qualitative way. It was hypothesised that the children's style of communicative interaction would indeed be a factor in forming an impression of ability, in a sizeable proportion of the respondents.

To formally assess this, the percentage of responses in which each theme appeared, was calculated.

It was hoped that this last set of qualitative responses would be helpful in better understanding the role that communicative style (with HEU the independent variable) played in the formation of adults' beliefs. It was, however, a relatively informal type of analysis, with limited intended scope for studying these qualitative aspects. Thus the analysis of subjects' responses did not attempt to address the *emphasis* that might be placed on communicative style relative to other perceived factors, but rather to determine if it simply occurred as a theme in large numbers.

8.6 Results of study 3, adult evaluation of children's problem-solving

The findings for overall trends (pooled subject data) on the two sets of questionnaires will be reported first, along with relevant central tendency values. These overall findings will hopefully establish a picture of how the subjects, as a consolidated group, seemed to view the four children and their "help-eliciting" styles. This will be followed by a more detailed description of differences and similarities between the two experimental groups, "experienced" and "inexperienced."

Table 8.01 Adult evaluation of task-ability as a function of level of help-eliciting and Friedman non-parametric analysis of variance results

RESULTS OVERALL	Low HEU	High HEU	Low HEU	High HEU	df = 3	
	Girl	Girl	Boy	Boy	Chi2	p-value
Question 1: Puzzle appropriateness to level of ability	1=too easy, 7=too difficult					
Median	4	6	4	5	55.84	.0001
Range	2-6	4-7	3-6	3-6		
Question 4 Perceived need for help	1=very little, 7=a lot					
Median	2	5	2	3	56.83	.0001
Range	1-5	2-7	1-6	1-7		
Question 5: Perceived level of confidence	1=very little, 7=a lot					
Median	6	2	6	4	80.10	.0001
Range	3-7	1-4	1-7	2-7		
Question 6: Skill vs. luck	1=very few, 7=many					
Median	3	5	3	4	38.83	.0001
Range	1-7	1-7	1-6	2-7		
Question 7: Level of independence	1=very dependent, 7=very independent					
Median	6	2	5	4	67.75	.0001
Range	1-7	1-3	1-7	2-6		

Table 8.02 Adult evaluation of task-ability as a function of level of "help-eliciting." Individual comparisons between pairs of children using Wilcoxon signed-rank tests.

CHILD PAIRS	Target Questions				
	Question 1 Ability	Question 4 Need/help	Question 5 Confidence	Question 6 Skill/Luck	Question 7 Independ.
High HEU Girl Low HEU Girl z-value p-value	-4.91 .0001	-4.88 .0001	-5.27 .0001	-4.24 .0001	-4.89 .0001
High HEU Boy Low HEU Boy z-value p-value	-2.44 0.010	-2.91 0.004	-3.41 0.001	-2.63 0.010	-2.90 0.004
High HEU Girl High HEU Boy z-value p-value	-3.80 .0001	-3.58 .0003	-5.20 .0001	-3.09 .0020	-5.06 .0001
Low HEU Girl Low HEU Boy z-value p-value	-1.92 0.06	-0.76 0.45	-1.33 0.18	-0.82 0.40	-0.99 0.31
High HEU Girl Low HEU Boy z-value p-value	-4.95 .0001	-4.93 .0001	-5.13 .0001	-5.00 .0001	-5.13 .0001
High HEU Boy Low HEU Girl z-value p-value	-4.05 .0001	-4.06 .0001	-4.71 .0001	-2.54 .01	-3.54 .0004

8.6.1 Results of analysis of individual questionnaire responses

Question 1: Perceived task-appropriateness

The first target question ("Did this puzzle seem appropriate for the child's level of ability?") pertained to perceived ability relative to how difficult the puzzle appeared

to the subjects. On the seven point scale a 1 indicated a belief the puzzle was too easy for the child, while a 7 indicated a belief that the puzzle was too difficult for the child. Results of the Friedman test (Table 8.01) indicated a significant difference in the evaluations for the four children ($\chi^2=55.84$, $p\leq.0001$). As hypothesised, the greatest discrepancy occurred between the high-HEU children overall and the low-HEU children overall. The low-HEU boy and girl both received equal median ratings of 4. In contrast, the high-HEU girl and boy received ratings of 6 and 5 respectively. On this question, the subjects overall appeared to have found HEU use the most salient factor compared rather than the gender of the children. However, none of the median values either exceeded a rating of 6 or dropped below 3 which suggests that overall subjects perceived the puzzle to have satisfactorily challenged all four children, without becoming too hard for any.

Individual comparisons using Wilcoxon signed rank tests yielded, as expected, a non-significant difference between the low-HEU boy and low-HEU girl. However, a significant difference was found in the perceptions of the high-HEU girl and high-HEU boy. Although matched for "help-eliciting," the girl was perceived to have found the puzzle more difficult than the boy ($z=-3.80$, $p\leq.0001$). This significant difference was to become a pattern with the other target questions. The individual high vs. low HEU comparisons yielded significant differences (female pair: $z=-4.91$, $p\leq.0001$; male pair: $z=-2.44$, $p\leq.01$). Similarly, the individual high vs. low HEU comparisons across mixed gender pairs also yielded highly significant differences (high-HEU girl/low-HEU boy: $z=-4.95$, $p\leq.0001$; high-HEU boy/low-HEU girl: $z=-4.05$, $p\leq.0001$).

Question 4: Perceived need for help

Question 4 asked subjects: "Do you feel the child could have done with some extra help?" Whereas **Question 1** was intended to elicit belief about puzzle-solving ability, question 4 was concerned with subjects' impressions about the child's *apparent* need for help on this puzzle. The results of a Friedman test indicated significant differences between responses ($\chi^2=56.83$, $p\leq.0001$). Subjects' median scores on the dimension of perceived need, were 2 for both the low-HEU girl and low-HEU boy. As with the subjects' belief about task-appropriateness, the high-HEU girl and boy were perceived to be significantly more in need of assistance, with median ratings of 5 and 3 respectively, as indicated by the comparison across HEU pairs (Table 8.01).

The individual post-hoc analyses (Table 8.02) resulted in the very same pattern to Question 1, whereby all high/low HEU pairs were differentially judged to need help (in all cases $p \leq .005$). Whilst the low-HEU pair were considered to be equally low in their need for help. The high-HEU girl, again, was perceived as needing more help than her high-HEU male counterpart ($z = -3.58$, $p \leq .001$).

Question 5: Perceived level of confidence

Question 5 was comparatively direct in its request to rate the children on their degree of confidence on the puzzle. This question resulted in significant differences on a Friedman test ($\chi^2 = 80.10$, $p \leq .0001$) and the greatest discrepancy again, appeared between the high-HEU children and the low-HEU children (Table 8.01). Subjects again rated the low-HEU children to be identical in confidence level, having median ratings of 6, indicating an opinion that they were both quite high in confidence. The high-HEU children were both considered to have less confidence than the other two children, although a similar divergence occurred between them. The high-HEU girl's ratings had a median of 2, compared with 4 for the high-HEU boy ($z = -5.20$, $p \leq .0001$). Mixed HEU pairs for this question, as in the previous ones, yielded highly significant differences in the expected directions (see Table 8.02).

Question 6: Perceived role of luck vs. skill

Question 6 asked the subjects: "How many correctly placed pieces seemed to occur by luck?" This is by direct implication, concerned with perceived level of skill exhibited by each child. The more successes attributed to luck by subjects, presumably the less they believed skill had played a part. Similar results occurred in the subjects' ratings, with significant differences indicated on a Friedman test ($\chi^2 = 38.83$, $p \leq .0001$). Subjects on this question responded with equal median ratings of 3 for the low-HEU girl and low-HEU boy. Across individual pairs (Table 8.02), the opinions again expressed a belief that the high-HEU girl and boy relied more on luck than the two low-HEU children, although the difference between the two high-HEU children persisted on this measure as well. The girl's ratings had a median value of 5, versus 4 for the boy, indicating a greater perceived reliance upon luck ($z = -3.09$, $p \leq .01$), whilst perceptions of the low-HEU girl and boy did not significantly differ.

Question 7: Perceived independence

Lastly, **Question 7** asked respondents to rate the four children on how independently they appeared to have behaved during the solving session. The main effect remained, whereby the subjects believed the children to be significantly different with regards to levels of independence ($\text{Chi}^2=67.75$, $p\leq.0001$). Median ratings for the low-HEU girl and low-HEU boy were 6 and 5 respectively (indicating slightly greater perceived independence in the girl, though not approaching significance ($z=-.99$, $p=.31$). In contrast the High-HEU girl and boy had ratings with a median of 2 and 4 respectively, again differing significantly ($Z=-5.06$, $p\leq.0001$).

8.6.2 Results of follow-up comparative questionnaire

As described in Section 8.5.2, the follow-up comparison questionnaire was designed as a relatively informal test to validate the measures obtained on the individual questionnaires. That is, they served to cross examine the subjects on their previously expressed opinions to determine if their "naive" responses (ones prior to explicit comparisons) mapped onto those of the follow-up questionnaire. The pattern of responses (Table 8.03) was very similar to the findings from the individual questionnaires. Each question on this follow-up questionnaire related to an aspect of performance or ability on the puzzle-task. Subjects ranked the children from least to most on each of these *perceived* dimensions of task-ability and confidence. The measures of central tendency used for this set of data are the median scores for each question. As discussed in Section 8.5.4, a Friedman test was used to determine if a significant difference occurred between the four conditions pertaining to level of "help-eliciting."

Table 8.03 Adult ranking of children as a function of level of help-eliciting: results of follow-up comparative questionnaire, analysed with Friedman test

FOLLOW-UP QUESTIONNAIRE
RESULTS OVERALL

	Low HEU	High HEU	Low HEU	High HEU	df = 3	
	Girl	Girl	Boy	Boy	Chi ²	p-value
Question 1: Least/Most help from experimenter						
Median	2	4	1	3	60.24	.0001
Range	1-4	1-4	1-4	1-4		
Question 2: Least/Most time to solve						
Median	1.5	4	2	2.5	49.76	.0001
Range	1-4	1-4	1-4	1-4		
Question 3: Least/Most HEUs						
Median	2	4	2	3	69.40	.0001
Range	1-4	1-4	1-3	1-3		
Question 4: Least/Most Confidence						
Median	3	1	3	2	12.33	.006
Range	1-4	1-4	1-4	1-4		

Table 8.04 Adult ranking of children's task-ability as a function of help-eliciting. Individual comparisons between pairs of children using Wilcoxon signed-rank tests.

CHILD PAIR COMPARISONS	Question 1 Need/help	Question 2 Solving Time	Question 3 Help-eliciting	Question 4 Confidence
High HEU Girl Low HEU Girl z-value p-value	-4.87 .0001	-4.76 .0001	-4.76 .0001	-2.00 0.05
High HEU Boy Low HEU Boy z-value p-value	-3.53 .0004	-2.62 .009	-4.09 .0001	-1.59 0.11
High HEU Girl High HEU Boy z-value p-value	-4.43 .0001	-4.26 .0001	-4.52 .0001	-2.16 0.03
Low HEU Girl Low HEU Boy z-value p-value	-0.12 0.91	-0.42 0.68	-0.91 0.91	-0.86 0.86
High HEU Girl Low HEU Boy z-value p-value	-4.88 .0001	-4.86 .0001	-5.25 .0001	-2.20 0.03
High HEU Boy Low HEU Girl z-value p-value	-3.94 .0001	-3.27 0.001	-4.43 .0001	-1.70 0.09

Question 1: Perceived need for help from experimenter

On the first question, which asked subjects to rank the children on apparent need for help, the low-HEU girl and boy received median ranks of 2 and 1 respectively, placing them as the two perceived to need the least amount of help. In contrast, the high-HEU girl and boy were assigned ranks in the latter two positions, representing greater perceived need for help, the high-HEU girl more so than the boy (median rank = 4 and 3 respectively). These differences overall (Table 8.03) were found to be highly significant on a Friedman one-way non-parametric analysis of variance ($\chi^2=60.24$, $p \leq .0001$).

Comparisons across individual pairs of children, using Wilcoxon tests, also yielded a pattern extremely similar to that of the individual questionnaire results (Table 8.04). For **Question 1** and the following three questions, no significant differences were found between the low-HEU girl and low-HEU boy. In contrast all the mixed-HEU pairs (same and mixed gender) yielded highly significant differences (in most cases $p \leq .0001$) in the expected direction. As before, the high-HEU girl was perceived to need more help than her high-HEU boy counter-part ($z = -4.43$, $p \leq .0001$).

Question 2: Perceived solving time

The manner in which subjects ranked the children on the second question followed a very similar pattern. In ranking the four children on the basis of perceived time to solve the puzzle, median ranks of 1.5 and 2 were given for the low-HEU girl and low-HEU boy respectively, whilst median ranks for the high-HEU girl and high-HEU boy were 4 and 2.5 respectively. Overall differences in rankings were indicated to be highly significant ($\chi^2 = 49.76$, $p \leq .0001$).

With regard to individual comparisons, the low-HEU girl was perceived (marginally) to have been quicker at solving the puzzle than the low-HEU boy, though this difference did not approach statistical significance ($z = -.42$, $p = .68$). Once again, all the mixed-HEU pairs of children (across same and mixed gender pairs) yielded highly significant results, all at the .01 level or higher (Table 8.04). Subjects again perceived a difference between the high-HEU girl and high-HEU boy on this measure as found in previous comparisons ($z = -4.26$, $p \leq .0001$).

Question 3: Perceived help-eliciting

For this third question subjects were being asked to judge a feature in which the children did in fact differ. The intention was to examine, in a general way, subjects' awareness of actual differences that had been manipulated. This was of interest in combination with the data for Question 4, which elicited opinions with regard to the children's relative degrees of confidence. For example, finding that subjects attended accurately to levels of "help-eliciting," but did not make significant distinctions on judgements of confidence, would imply that "help-eliciting" was not necessarily a salient factor for estimating levels of confidence.

Question 3 resulted in equal median ranks for the low-HEU girl and boy again (both 2.0) which were both lower than those given to the high-HEU girl and high-HEU boy, which were 4.0 and 3.0 respectively. An significant overall difference was indicated by a Friedman test ($\chi^2=69.40$, $p\leq.0001$).

The two low-HEU children, as before, were not seen as being different on this measure ($z=-.91$, $p=.91$), whilst the high-HEU girl was seen to be help-seeking more than the high-HEU boy $z=-4.52$, $p\leq.0001$). All mixed-HEU pairs were identified as differing significantly in their level of "help-eliciting" (all at the .001 level or above). In contrast to the first two questions, which suggest a significant influence of the relative levels of "help-eliciting" upon interpretation and evaluation, these two latter sets of results indicate that subjects in general seemed aware of and sensitive to, the varying levels of "help-eliciting," information which formed the manipulated independent variables.

Question 4: Perceived level of confidence

Data from comparison **Question 4** yielded results which again put the median ranks for the low-HEU girl and boy on a par with each other (3.0), which indicated the highest degree of apparent confidence. The high-HEU girl and high-HEU boy had median ranks of 1 and 2 respectively. These differences overall were again statistically significant on a Friedman test ($\chi^2=12.33$, $p\leq.01$).

The pairs of children yielded a slightly different pattern to previous measures (see Table 8.04). There was, as previously, no difference between the low-HEU girl and low-HEU boy (both median scores of 3), yet a significant difference between high-HEU girl and high-HEU boy (medians 1 and 2 respectively; $z=-2.16$, $p\leq.05$). However, in this last question no significant difference was perceived between the high-HEU boy and low-HEU boy (median scores 2 and 3 respectively, $z=-1.59$, $p=.11$). Apart from the persistent differences expressed for the high-HEU girl and high-HEU boy, this was the only result which went counter to the expected results.

8.6.3 Results of free response question

The main aim of Study 3 was to test the hypothesis that "help-eliciting" may influence subjects' subjective evaluations of task-ability. This additional, more qualitative analysis of the subjects' impressions of the children's problem-solving was undertaken

primarily to see whether subjects were sensitive to "help-eliciting" as a relevant factor in assessing task-ability. This portion of the study was more exploratory in terms of data collection. Some subjective factors were reported which were not anticipated as salient themes for the subjects, but for the purposes of collating data from subjects' answers, broad categories were formed in which the most prevalent "themes" would belong. These are described below.

Self-reliance

"Self-reliance" was one broad category established to categorise instances of responses which loosely pertained to "help-eliciting" or "confidence." For the category of "self-reliance," subjects' direct mentioning of confidence, amount of help-seeking or need for help were counted as instances of this broad "theme." Also included were instances where subjects tried to describe elements of behaviour relevant to self-reliance such as responding with, ". . . whether they seemed happy to work on the puzzle on their own." Clearly "self-reliance" can refer to many more areas than just task-ability. However, the term was used here to reflect a generalised degree of independence and confidence.

Problem-solving strategy

"Strategy" was another category which included any mention of how the children approached the puzzle, their tactical efforts, as well as any descriptions of behaviour which fell into this category (e.g. "if they tried to fit the border pieces in first. . .").

Solving-time

As with the previous categories or "themes," this was loosely defined to include any direct mention of solving time in the various ways this could be expressed (e.g. "how long they took. . .," "how fast they could fit each piece").

In general, these were loose categories of behaviour and communication which reflected the most common salient aspects of the children's problem-solving, as the subjects perceived them.

The theme of "self-reliance" was found to be a frequently recurring concept as an indicator of task-ability. It was present in 61% of the subjects' answers. Solving time was thought to be a good indicator of task-ability for 58% of the subjects and "strategy" was expressed as a factor for 41% of the subjects. The only other commonly mentioned indicator that was thought to be important was "Spatial visualisation" which figured in 50% of the subjects' responses. From these findings it appears that generalised impressions of "self-reliance" (in which themes of "help-eliciting" "confidence" and "independence" were subsumed) may have played a role in subjects' judgements of the children's task-ability. It is important though, to note that ability indicators such as strategy and spatial visualisation did play a role in many subjects' impressions.

Those who mentioned "self-reliance" themes as important factors in judging ability were generally not, as a group, significantly more influenced by relative "help-eliciting" in their other evaluative responses (individual and follow-up questionnaires) than those who had not. On the individual questionnaires, it was the case that they had equal or *higher* median ratings compared with other subjects on the measures of perceived difficulty (Question 1), need for help (Question 4), reliance on luck (question 6) for the High-HEU children. With regard to perceived need for help, this difference was significant using a Mann-Whitney U test ($U=80.5$, $p \leq .01$). Those who had highlighted attributes related "self-reliance" provided a median rating of 5.5 (range 3 -7). The median rating for those who had not was 4.0 (range 2 - 6). This was a solitary significant difference on these sets of comparisons, therefore inferences can only be tentatively drawn as to the connection between self-reported opinions and levels of bias.

8.7 Comparison between "experienced" group and "inexperienced" group

The results comparing the two subject groups on the individual and direct comparison questionnaires are most striking for their *similarity* overall. Both groups of subjects provided responses which appeared to be significantly influenced by the independent variable of HEU style, which was manipulated across the four clips. Both groups yielded highly significant differences in evaluation amongst the four children, with the most dramatic divergence occurring between the high-HEU and low-HEU children irrespective of gender.

There were some discernible differences which seem to distinguish the "experienced" subjects from the "inexperienced" subjects (Table 8.05). However, these were too sporadic to be able to make even tentative conclusions as to the differences between "experienced" and "inexperienced" subjects. It was found, for example, that professionals provided median ratings of "independence" for the low-HEU girl that were significantly lower than the 1st year undergraduates' estimates (5.0 and 6.0 respectively, $U=88.0$, $p\leq.05$). The direction of such differences were reversed on estimates of "confidence" for the high-HEU girl, who was rated as more confident by the professional group (2.0 vs. 1.0, $U=67.0$, $p\leq.01$). One other significant difference which appeared pertained to the low-HEU boy who, on the dimension of task-ability (Question 1), was considered to have found the puzzle easier by the professionals ($U=102.5$, $p\leq.05$).

One other, rather more informative set of differences appeared with regard to the *variability* within the two groups. On the vast majority of the questions the range of responses was greater among the less experienced 1st year undergraduates. Only on one question and for one child (low-HEU girls on question 5, "perceived level of confidence"), did the range for the professionals exceed that of the undergraduates. Though still rather ambiguous in meaning, this difference does seem to agree with intuitive assumptions about experience and training in education. One might expect the amount of fluctuation in subjective evaluation of task ability to decrease with greater training and work experience with children.

Follow-up direct comparison questionnaire

As displayed in Table 8.06 the two experimental groups' rankings of the four children were compared across each of the four comparison questions. The dominant impression the results provide is one of striking similarity. No particular pattern emerged either in their various median ranks or in their degree of variability (as was found in analysis of the individual questionnaire responses). The only comparison which yielded a significant difference was their answers to Question 2 with regard to the high-HEU girl. Although the "experienced" and "inexperienced" groups had equal median scores (4), a Wilcoxon test indicated a marginally significant difference ($U=115.5$, $p=.05$), with higher ranks for solving time expressed by the "experienced" group (sum of ranks 20.92 and 15.79).

Table 8.05 Adult evaluation of task-ability as a function of level of help-eliciting, comparing "Experienced" and "Inexperienced" subject groups using Mann-Whitney U tests

LOW HELP-ELICITING GIRL	Professionals	1st Year Trainees	U-values	p-values
Question 1: Puzzle appropriateness to level of ability				
Median	4.00	4.00	153.00	0.77
Range	2.00	4.00		
Question 4: Perceived need for help				
Median	2.00	2.00	154.00	0.80
Range	4.00	4.00		
Question 5: Percieved level of confidence				
Median	6.00	6.00	154.00	0.79
Range	4.00	3.00		
Question 6: Skill vs. Luck				
Median	3.00	3.00	150.00	0.71
Range	4.00	6.00		
Question 7: Level of independence				
Median	5.00	6.00	88.00	0.02
Range	6.00	6.00		
HIGH HELP-ELICITING GIRL				
Question 1: Puzzle appropriateness to level of ability				
Median	6.00	6.00	123.00	0.18
Range	3.00	3.00		
Question 4: Perceived need for help				
Median	5.00	5.00	134.00	0.37
Range	4.00	5.00		
Question 5: Percieved level of confidence				
Median	2.00	1.00	67.00	0.001
Range	2.00	3.00		
Question 6: Skill vs. Luck				
Median	5.00	5.00	153.00	0.78
Range	4.00	6.00		

(cont. overleaf)

Table 8.05 Adult evaluation of task-ability as a function of level of help-
(cont.) eliciting, comparing "Experienced" and "Inexperienced" subject
groups using Mann-Whitney U tests

HIGH HELP-ELICITING GIRL (cont.)		Professionals	1st Year Trainees	U-values	p-values
Question 7: Level of independence					
	Median	2.00	1.00	139.50	0.44
	Range	2.00	2.00		
LOW HELP-ELICITING BOY					
Question 1: Puzzle appropriateness to level of ability					
	Median	4.00	5.00	102.50	0.04
	Range	3.00	3.00		
Question 4: Perceived need for help					
	Median	3.00	4.00	116.50	0.14
	Range	4.00	6.00		
Question 5: Perceived level of confidence					
	Median	4.00	4.00	127.00	0.26
	Range	3.00	5.00		
Question 6: Skill vs. Luck					
	Median	3.00	4.00	130.00	0.31
	Range	5.00	5.00		
Question 7: Level of independence					
	Median	3.00	4.00	159.50	0.95
	Range	3.00	4.00		
HIGH HELP-ELICITING BOY					
Question 1: Puzzle appropriateness to level of ability					
	Median	4.00	4.00	156.50	0.86
	Range	2.00	3.00		
Question 4: Perceived need for help					
	Median	2.00	2.00	154.00	0.81
	Range	3.00	5.00		

(cont.
overleaf)

Table 8.05 Adult evaluation of task-ability as a function of level of help-eliciting, comparing "Experienced" and "Inexperienced" subject groups using Mann-Whitney U tests

HIGH HELP-ELICITING BOY (cont.)	Professionals	1st Year Trainees	U-values	p-values
	Median Range	Median Range		
	6.00 5.00	5.00 6.00	145.00	0.58
Question 6: Skill vs. Luck				
	3.00 4.00	3.00 5.00	160.00	0.96
Question 7: Level of independence				
	5.00 5.00	5.00 6.00	160.50	0.97

Table 8.06 Adult ranking of task-ability as a function of level of help-eliciting
Comparing "Experienced" and "Inexperienced" subject groups using
Mann-Whitney U tests

LOW HELP-ELICITING GIRL	Professionals	1st Year Trainees	U-values	p-values
Question 1: Least/Most help				
Median	2.00	2.00	160.00	0.96
Range	1.-4.	1.-3.		
Question 2: Least/Most time to solve				
Median	1.00	2.00	138.50	0.43
Range	1.-4.	1.-4.		
Question 3: Least/Most HEU's				
Median	2.00	1.00	157.50	0.89
Range	1.-3.	1.-4.		
Question 4: Least/Most Confidence				
Median	3.00	3.00	129.50	0.29
Range	1.-4.	1.-4.		
HIGH HELP-ELICITING GIRL				
Question 1: Least/Most help				
Median	4.00	4.00	136.00	0.18
Range	1.-4.	3.-4.		
Question 2: Least/Most time to solve				
Median	4.00	4.00	115.50	0.05
Range	1.-4.	3.-4.		
Question 3: Least/Most HEU's				
Median	4.00	4.00	142.50	0.13
Range	4.-4.	1.-4.		
Question 4: Least/Most Confidence				
Median	1.00	1.00	117.00	0.09
Range	1.-4.	1.-4.		
LOW HELP-ELICITING BOY				
Question 1: Least/Most help				
Median	1.00	1.00	161.00	0.99
Range	1.-4.	1.-3.	(cont. overleaf)	

Table 8.06 Adult ranking of task-ability as a function of level of help-eliciting (cont.) Comparing "Experienced" and "Inexperienced" subject groups using Mann-Whitney U tests

LOW HELP-ELICITING BOY (cont.)	Professionals	1st Year Trainees	U-values	p-values
Question 2: Least/Most time to solve				
Median	2.00	1.00	146.00	0.60
Range	1.-3.	1.-4.		
Question 3: Least/Most HEU's				
Median	1.00	2.00	154.00	0.80
Range	1.-3.	1.-3.		
Question 4: Least/Most Confidence				
Median	3.00	3.00	118.50	0.16
Range	1.-4.	1.-4.		
HIGH HELP-ELICITING BOY				
Question 1: Least/Most help				
Median	3.00	3.00	123.50	0.23
Range	2.00	3.00		
Question 2: Least/Most time to solve				
Median	3.00	2.00	143.50	0.53
Range	2.00	3.00		
Question 3: Least/Most HEU's				
Median	3.00	3.00	146.50	0.50
Range	2.00	1.00		
Question 4: Least/Most Confidence				
Median	2.00	2.00	154.00	0.79
Range	2.00	2.00		
OPEN-RESPONSE QUESTION		Proportion of occurrences		
Perceived Factors in determining "ability"		Professionals		1st Year Under-grads
Help-eliciting/Confidence		68%		59%
Solving Strategies		47%		35%
Spatial Visualisation		58%		41%
Perceived Solving Time		26%		18%

8.8 Discussion and conclusions for adult evaluation study

8.8.1 Interpretation of main effects

Subjects in this study were shown video-clips of four children solving a puzzle, which were identical in duration. The children's actual, real-time performance was also on a par with one another and they were all of comparable age. The differences, representing the manipulated variables, were their gender and the degree to which they made utterances which could be interpreted as "help-eliciting." The analysis of the data from this third study appears to support the hypothesis that "help-eliciting" behaviour, regardless of actual need for help, has the potential for creating a misapprehension of children's and ability. As reported in Section 8.3, this finding received some validation with the further finding that those subjects who had specifically mentioned help-seeking as an important indicator of ability, did in fact rate the high-HEU girl as needing more help than other subjects who *had not* mentioned help-seeking as important. In this experiment these ratings were likely to have been expressed in terms of *perceived* performance and ability *relative* to the other three children. This raises the question of whether relative judgements can be as meaningful as more absolute measures (difficult to envisage, but perhaps involving interval or ratio data collection for perceptions of individual children without the chance to make comparisons with any other child.

However, there is a degree of ecological validity in eliciting judgements in relative terms (implicit in this study). Although standardised and externally validated assessment in later years of schooling may provide objective and more absolute measures (e.g. IQ. tests, T.A.T.s), unofficial *comparative* assessment may occur in the comments and interactions of teachers and children on a day-to-day basis. It seems likely that this interaction, especially at younger age levels, may be greatly influenced by adults' subjective beliefs about the children they teach (Babad and Inbar, 1982).

In this experiment, there was a highly significant difference in expressed belief about the relative performance and ability of the four children. The other hypothesis of this study was that the level of "help-eliciting" would be a factor in assessment of task-ability that would manifest itself over any gender bias. This expectation was largely supported by the findings. On every question on both sets of questionnaires, the high-

HEU girl and high-HEU boy were rated as less capable and less confident than the low-HEU girl and low-HEU boy. There was, however, some amount of fluctuation within the two behaviour types, particularly between the high-HEU girl and high-HEU boy. There was a consistent trend of lower evaluations for the high-HEU girl, which might suggest an interaction between "help-eliciting" style and gender. If so, it may be the case that a child being female *and* behaving in a stereotypically consistent way is a combination which creates the strongest influence. This was a point raised in the research of Newcombe and Arnkoff (1979), who found that it was the deferential style of the speaker (male or female) which resulted in lower estimates of assertiveness, but that females in fact displayed this mode of communication more, thus creating an *indirect* gender bias. If a direct gender bias related to problem-solving was the predominant effect in this study, than one would expect negative assessments to create a ranking in which the high-HEU girl would receive the most negative assessments, followed by the low-HEU girl, the high-HEU boy and the low-HEU boy. However, gender per se did not create as biasing an effect as "help-eliciting" in this context.

There is the possibility that the lower evaluations for the high-HEU girl, relative to the high-HEU boy, were due to uncontrolled aspects of the video-clip selection. As described in Section 8.4, the stimulus clips were selected on the basis of proportional HEU scores, matched solving time and age. However, these requirements greatly limited the number of possible clips that could represent the needed gender/behaviour combinations. The degree to which the high-HEU boy matched the behaviour of the high-HEU girl is partly affected by these constraints. This would also be the case for all other sets of comparisons. Although the pair of edited clips were matched for solving time, approximate age and degree of "help-eliciting" within each of the two levels, individual differences which might affect viewers' perceptions do inevitably remain. This might include tone of voice, subtle differences in affect, etc.

Since the children did not actually differ on performance in terms of solving time, the high degree of statistical significance testing these differences in belief would imply that the subjects had become dramatically influenced by their interpretation of the children's "help-eliciting" style. It appears that "help-eliciting" style did have a biasing effect, however it seems intuitively unlikely that this *experimentally* produced level of bias could be expected to occur in actual nursery settings. In actual nursery schools and other educational settings, the amount of time available to make interpretations

of children's behaviour is greater. In addition, real interactions as opposed to passive viewing of two dimensional video-tape information, most certainly provides a richer combination of verbal and non-verbal cues to a teacher or caregiver. Moreover, actual classroom presence would involve viewing children in successive and usually very different problem-solving contexts, thereby further mediating biasing effects of a communicative style. Another possibility one might raise in counterpoint to the concerns about bias feedback, is the adaptive and positive aspects of help-seeking. This was discussed in Section 2.5.2 with regard to *effectance motivation* (Harter, 1978; De Cooke and Brownell, 1995). Having the capability to ask instrumentally helpful questions is a skill which children learn to acquire. De Cooke and Brownell reported a distinct age effect whereby children's help-seeking increased significantly from around 18 months to two years. This is described as being more complex than simply having increasing linguistic resources to verbally seek help, but rather an integration of language development and the growing awareness of help-seeking as an effective solving strategy, something that younger toddlers may not know how to utilise, even if they had the linguistic ability to do so.

In Study 3 there was an awareness among the subjects of differing levels of help-seeking behaviour (as demonstrated in their follow-up questionnaire data) and perhaps even an awareness that it did not reflect intrinsic ability (or lack of ability). It is possible that they were able to infer that "help-seeking" was part of the children's solving strategy and that their evaluations were based upon how much help they *wanted* rather than how much help they *needed*. This would, presumably also go for judgements regarding *independence*. This type of situation seems to typify interactions where the adult must be aware of the level of skill physically demonstrated whilst interpreting the verbal behaviours which may signal the subjective limits of the child's ability. Ideally, the amount of help offered (or in this case estimated to be needed) will be that which is just sufficient to enable progress without undermining the autonomy of the child. "Scaffolding" of this sort is described to take place within Vygotsky's *zone of proximal development* and because of the way it is conceived can be theorised to benefit different children in highly individualistic ways. If girls do simply seek help more than boys, than an adult, *who is aware* of stylistic differences in problem-solving, can always match his or her instructive support to the child's objective needs.

However, the findings in Study 3 do suggest that children's degree of "help-eliciting," which in some contexts may simply be part of his or her social repertoire, does have the potential to have a negative effect upon adults. The adult subjects' responses regarding their beliefs about the children's relative reliance upon luck rather than skill, is difficult to explain within a Vygotskian perspective. What may be of concern therefore, are subtle and long term biasing effects which may feed back to the child through negative expectations of achievement.

One important related area of research is in children's locus of control and, similarly, development of helplessness cognitions. Cain and Dweck (1995) review recent research (e.g. Bandura and Dweck, 1986; Henderson and Dweck, 1990) that has helped provide a model of children's developing understanding of their own ability. They describe some children as having an *entity concept* of intelligence and ability, whereby these are seen as unchanging, permanent individual characteristics; versus those who have an *incremental concept* of intelligence and ability--where these are seen as malleable and related to maturation. The former, they assert are more prone to displaying learned helplessness tendencies and greater external locus of control. An important point, relevant to the findings of Study 3, is the research they cite (e.g. Stipek and MacIver, 1989) which has identified age group effects in this area. Children younger than age 4 - 5 do not yet have the cognitive maturity to understand concepts of *ability* and *achievement* and thus have rarely been found to attribute problem-solving failure to intrinsic ability (one central aspect of helplessness). However, in Studies 1 and 2 children younger than age 4 - 5 (particularly girls), were in fact communicating in ways which to the naive listener would appear to reflect their beliefs about their own intrinsic ability. Recalling the findings for *orientation* of the children's speech acts (Section 6.3), it was the girls who were found to make the most "help-eliciting" statements that were *about themselves* (e.g. "I can't do this puzzle,") as opposed to more "objectifying" references made about the puzzle itself (e.g. "Where does this piece go?")

Considering the degree of influence that "help-eliciting" seemed to have for naive viewers in Study 3, there may be the potential for a powerful interaction between normal cognitive development (growth of self-attributions about ability) and problem-solving feedback from adults. That is to say, if girls' self-directed "help-eliciting" (which may in fact serve a social purpose) is reinforced with either well-meaning help

that is not really needed or with "leakage" of negative evaluation, then this may colour their developing sense of autonomy.

8.8.2 Differences between experimental groups

As reported in the results section, the overall main effects overshadowed differences between the two experimental groups. For both groups there were highly significant differences in evaluative judgements made in response to the four children. The differences between groups which could be detected usually did not reach statistical significance. There were only subtle differences between the two experimental groups which emerged in the analysis of the individual questionnaires, but not the follow-up questionnaires. As reported earlier, there was a pattern of greater variability among the undergraduates, which may have some connection with level of training and experience.

Although the findings failed to provide statistically conclusive evidence, there was sporadic support for the hypothesis that more experienced and trained adults may be more sensitive to the diverse set of cues available in an adult-child interaction. In this study, these cues, particularly concerning actual progress and achievement motivation, were present within the biasing "noise" of "help-eliciting" behaviour. There were, in fact, several subjects who identified higher "help-eliciting" (in the answers to the free-response question) as a particularly adaptive behaviour and rated those children in a more positive light. This interpretation of verbal style *only* occurred among individuals in the "experienced" group. This trend observed seems to be an encouraging indication of the role that training and experience may play in mediating potential bias.

Other areas of research have shown that a decrease in bias with age and experience is not a foregone conclusion. In a study by Condry and Condry (1976), for example, "experience with young children" was studied as a variable in a gender bias experiment. They used a design in which an infant is presented as either male or female to subjects who were asked to make various attributions relating to affect. They examined the role of gender of child, gender of subject and *experience* as factors in the degree of bias exhibited. Besides the main findings of sex-bias in the interpretation of several emotion dimensions, there were effects attributable to level of experience. Greater biasing occurred in their "high-experience" group than their "low-

experience" group, though it was more pronounced in the male subjects. In a very different type of study Babad (1977) found bias among older subjects but not in younger ones, differences which may in fact be a function of experience. This study compared the ratings of college principals with those of undergraduates in response to two articles described as being authored by a "high prestige" or "low-prestige" writer. The older subjects (principals) had biased ratings for both articles, whilst the younger undergraduates showed bias on only one of the rating tasks.

The relatively large amounts of such findings in general is perhaps less surprising when one considers these in light of the extensive research demonstrating the *persistence* of these feedback systems (Harris and Rosenthal, 1985) and their self-perpetuating nature (Bates, 1976; Jussim, 1986, 1989). In an uninterrupted cycle of biased expectation one might, in some contexts, expect the propensity to become biased by ambiguous or misleading information to increase over time.

The experimental design of this study, whilst incorporating "experience" as a factor, was primarily concerned with testing the hypothesis that the level of "help-eliciting" behaviours can have a biasing effect on naive observers. An expectation was that adults with some experience working with children would be less influenced by communication style than those with far less. However, this part of the research was not intended to be an *ideal* tool for examining the factor of "experience." In future research it will be of interest to develop experimental and/or observational methods with which to explore how and to what extent, teachers' training and years working with children come to affect their ability to make interpretations of children communicative styles. As mentioned in Section 8.3.2, this kind of study should take into account age, socio-economic background, gender and other factors besides training and experience.

CHAPTER 9 DISCUSSION OF FINDINGS OVERALL AND CONCLUDING REMARKS

9.1 Recapitulation of research questions and hypotheses

In the last two and a half decades there has been an enormous volume of research produced, part of which was reviewed in Chapter 2, which has explored gender differences in communication. The breadth of this work has left us with an extensive, though not conclusive, picture of the development of language ability in general. Specifically relevant to this thesis is the emergence of distinct gender differences in communication, both in terms of *how* language is expressed (form), as well as the motivations behind *when* (context) and *why* (function) it is expressed. Most research looking at communication has chosen, quite sensibly, the more overtly social settings in which to look at language and communication, both of which are, by definition, social. However, it has been argued (Halliday, 1993) that children's growing linguistic ability centres around their *constructions* of social realities, as Piaget had argued that some cognitive development centres around the child's construction of their physical realities. It has also been argued in this thesis and in the past by others (Becker, 1990, Halliday, 1975) that children's social motivation is omni-present and persists across various contexts besides the ones adults (including experimenters) decide are "social" ones.

The point was raised that very little research examining children's *social* behaviour has been conducted in environments which would be conventionally labelled as being "task-oriented" or "serious" (typifying contexts one finds in schools when even very young children are meant to be "working"). Thus a central question raised in this research was whether there is communication which occurs within problem-solving settings and has all the outward appearances of task-oriented language--but serves a more subtle social purpose. This question arose out of the inexplicable finding in earlier MA work of greater female help-eliciting behaviour which did not always appear to have a straight-forward relationship with task-ability. Exploring this issue in a systematic and more thorough way was the primary task undertaken in this project. Specifically, the research questions were: Do preschool girls and boys express themselves differently in formal problem-solving settings? Can communicative differences, if any, be shown to have any relationship with how well they actually get on with a problem-task?

A further question, partly contingent upon the answers to the others, was whether any specific verbal behaviours could be reliably identified in a formal task-setting, that might reflect areas of indirectly social motivation which, as perceived by an adult, might be interpreted as being strictly task-related.

9.2 Children's problem-solving communication: discussion of overall results

We found in Study 1 that in this formal problem-solving setting of moderate difficulty, girls were using significantly more speech acts than the boys which could be labelled as "help-eliciting." A persistent stereotype is that females are more verbose in general than males, thus help-eliciting *should* logically be greater. This conventional wisdom has never actually been supported by the research evidence, just the opposite in fact (Tannen, 1990; Coates, 1987; Coates and Cameron, 1989). This "common-sense" belief was also not supported in this study, as no discernible differences emerged in the children's overall talkativeness.

It seems reasonable to assume that these communicative differences might reflect intrinsic confidence differences between the boys and girls. This explanation might especially appeal to proponents of achievement expectation differences, as well as those who ascribe importance to spatial ability differences, since the problem presented to the children was arguably a spatial one. Thus one might argue that it would not be surprising to find evidence for lesser confidence and therefore greater help-eliciting among girls in such a context. The relationship that emerged between the children's amount of help-eliciting and their solving speed did not support this, however. The relationship between task-difficulty and the boys' help-eliciting *does* seem to support our conventional assumptions about task-related communication. The girls' does not. The frequency (*as a proportion of all utterances*) of their help-eliciting utterances bore no relationship with their solving times, whilst for boys longer solving time predicted significantly more help-eliciting. Recalling the comparisons between Pilot Study data and Study 1 data (Section 6.9), it was found that the girls from the two studies (matched in age overall) were significantly different in their degree of help-eliciting. Those in the more difficult "condition" (Pilot Study) used *fewer* help-eliciting utterances than their Study 1 counterparts. Among the boys no significant difference was found. As discussed previously, one must use these findings with some reservation due to the greater diversity of the Study 1 children. However the findings do suggest that in order to remain committed to a lesser female confidence theory (within this context), one would have to hypothesise that for girls only, ability predicts lack of "confidence" (as an interpretation of "help-eliciting".) Intuitively at least, this seem highly improbable, particularly since there was a strong

impression of equal levels of enthusiasm and persistence on the puzzles.

The research in pragmatics, discussed in Section 2.9, tries to take account of language which serves dual purposes (even cross-purposes) and almost everyone is familiar with the non-literal or indirect social function in certain utterances, especially ones which provide mutually obvious information. However, this is relatively subtle and sophisticated, a linguistic skill even adults are not always conscious of using. Such language use is not often attributed to preschoolers. However, the findings of this study suggest that girls in particular are perhaps using help-eliciting as a socially engaging device (e.g. "where does this piece go?" with the gloss, "would you like to join me?"). This seems more likely if one interprets the correlational analyses as indicating that those girls who had the cognitive resources to spare, were the ones able to afford the social diversion of asking for assistance or participation. That such a linguistic trick should occur mainly among the girls at this age is consistent with all the research pertaining to gender differences in linguistic development.

Some parallel findings from even earlier ages are available. For example, Gunnar and Donahue (1985) found, in a study of infant responsiveness in maternal interactions, that girls were more responsive to mothers' vocal initiations and by age three were making more social initiations than the boys. They state that, "These sex differences in sociability did not reflect differences in the amount of time spent manipulating toys, nor did they reflect sex differences in the frequency of vocalisations. . ." (p. 262).

Study 1 also examined the frequency of more straight-forward social behaviour. The girls were nearly exclusively the users of collaborative expressions and those girls who did use these constructions, tended to be the quickest puzzle solvers. The girls were also observed to have a greater proportion of their utterances as being grammatically *about themselves* and used less "instrumental" puzzle-oriented utterances, which had strongly characterised the boys' utterances. The girls' more frequent self-directed utterances seem in line with the extensive research on self-disclosure and is relevant to the discussion of social drives, since self-disclosure is often described as a fundamental aspect of social rapport.

9.3 Theoretical implications of findings

9.3.1 Revisiting "social versus achievement" motivation

These findings overall have generated several important issues that were discussed at length in Chapter 7. One is the commonplace and "common-sense" belief that social motivation and its associated constructs--cooperativeness, deference, affiliation and even compliance--represent a female *priority*, one that supersedes all others, particularly achievement motivation (manifest in competitiveness, task-mastery, aggression, ambition, etc.). Van Hecke, Tracy, Cotler, Ribordy and Sheila (1984) made this point with regard to conflict between adult approval and task-mastery. They found (counter to Van Hecke's (1983) findings) that girls did not in fact sacrifice achievement motivation (high probability task-choice) for adult reinforcement (encouragement) of a low probability choice. Maccoby and Jacklin's (1974) review of achievement motivation and self-concept research seriously blunted the scientific case for greater male achievement motivation. It did not, however, conclusively counter the evidence for lesser confidence or for female social expressiveness. "Confidence," "achievement expectation" and "achievement motivation" are not explicitly equated in the relevant literature. However, there are implications in both the scientific literature (e.g. Macaulay, 1978) and in everyday language that expression of self-confidence, achievement motivation and expectation are somehow integrally linked. This is a persistent belief which may stem from the fact that it is difficult to imagine a child feeling intrinsically motivated towards an activity, for which they *seem* to express lack of confidence and achievement expectation. Thus, one argument presented in this thesis is that greater female affiliative motivation, possibly expressed at times through help-seeking, is not a drain on the resources of achievement or ambition, like some high-consumption appliance drawing off essential electrical current from a circuit. According to many feminist researchers, this concept is a still-flourishing belief which reflects a fundamental faith in the masculine model of achievement.

This latter position is now far more widespread in the theoretical literature. The results of Study 1 support a model of equal male and female achievement motivation and ability, in spite of differences in apparently social motivation, but equally important they identify a serious problem in *interpretation*. There is a growing appreciation of the benefits of social interaction (including effective help-seeking behaviour) in problem-solving. However, the findings of Study 1 suggest that even among very young children, social facilitation may occur in a way that could be easily misconstrued as dependency or even helplessness.

One potential criticism of the model of behaviour proposed in this work, is that the evidence presented for greater female social engagement through indirect or perhaps non-literal use of language, particularly their help-eliciting, is circumstantial. The girls exhibited a constellation of linguistic behaviours which pointed to greater affiliative motivation, largely supported by the premise that they were no less confident or goal-directed. It is inevitably difficult to obtain standardised measures of such things as confidence and achievement motivation. In this study the belief that the girls and boys were equal in their confidence and task-motivation was a deduction based on their equal solving speed, the lack of predictive value of the girls' solving time for level of "help-eliciting," their use of collaborative expressions and their outwardly equal levels of enthusiasm and persistence. The sum effect of these observations provides the support to allow one to suggest that their help-eliciting utterances are indirect social devices. Whilst advocating this interpretation, it is also important to be able to accommodate alternative possibilities. Firstly, in spite of all the outward signs described above, girls in this context may indeed experience subjectively lower confidence or achievement expectation. Conversely, the greater help-eliciting observed may be the product of early socialisation towards a "schema" of interdependency (in a *social* sense) where young girls accommodate a style of problem solving which assumes help-seeking as an integral part. A third alternative proposal is that preschool girls' achievement standards in this context may be slightly higher than boys, not implausible considering their more advanced cognitive development in various areas, relative to boys. With the "stakes" higher for the girls, perhaps more strategic help-seeking behaviour occurs. Thus in relative terms, accounting for possibly differing expectations for the problem, girls' help-seeking is not greater than the boys. Clearly these hypotheses will require extensive additional research, along with acknowledgement that any emerging model will require an integrative approach with regard to all of these possibilities.

9.3.2 Differentiating "meaning" and "intended meaning"

A question addressed in the literature review is: Can 3-4 year olds really use language in these abstract ways? If they can, is it intentionally or consciously done? On one level the first question is very simple and the answer is "yes" if either girls' or boys' help-eliciting serves to engage another person in a problem-solving task (whatever the beliefs of that other person). On a more philosophical level where one finds debate among language philosophers, both questions intermingle in a way which make an answer for either difficult. This is because of the supposed inability of an utterance to have a particular meaning (with an effect on a listener) without a

matching intention on the part of the speaker (Grice, 1969). In other words, according to Grice's axiom of intentionality in non-natural language use¹, a child *can* use language this way, if they *intend* to use language this way. In actual practice, this may create something of a tautology, since an intention to formulate a linguistic construction, is often the ability to do so. Grice's axioms about intentionality in meaning have been questioned by others such as Searle (1969) and Recanati (1986) who discuss the ability to have a certain perlocutionary *force* which can be independent of perlocutionary *intent*. As discussed, there is widespread support for a theory of innate social motivation--which has very clear adaptive function for inclusive fitness (Becker, 1990; Trevarthen, 1994). From this research one might suggest that a human infant or young child need not have conscious intentionality to perform an act of meaning--if the meaning itself (social invitation) is innate.

9.3.3 Children's linguistic abilities

With regard to whether the girls in this study had the *linguistic* (i.e. linguistically planned out) intention of eliciting participation from the experimenter through their HEUs (perlocutionary intent), one might hypothesise that they did not or rather could not have the linguistic intention (however to speak conclusively about this would require proving a negative, which is never easy). However, the *social* intention was evidently there; and according to several researchers (Halliday, 1975; Becker, 1990; Ochs-Keenan, 1983) that is all that is necessary, since language may occur as a natural and *automatic* outcome of a social intention. The primacy and innateness of *social* intention, as discussed in Chapter 2, is on a far more solid theoretical footing. This implies that if a child wants to engage an adult in an activity, they do not need to *consciously* form speech acts to accomplish this. Bruner, in discussing context and speech acts says, "If children are acquiring notions about how to interpret the intentions encoded in utterances, they must be taking account not only of the structure of the utterance, but also the nature of the conditions that prevail just at the time the utterance is made." (p. 37) This seems to be a truism about language in general, but in learning language for the first time, it also seems likely that the context not only gives clues about utterance meaning, but also provides a model for how the child may later construct a similar utterance. The research on children's learning of the pragmatic nature of questions (e.g. "test-questions," James and Seebach, 1982; Vaidyanathan, 1988) supports this possibility and perhaps can explain rather

¹ Grice (1969) proposed that: "U meant something by uttering x' is true if: (1) U intended, by uttering x, to induce a certain response in A (2) U intended A to recognise, *at least in part from the utterance of x*, that U intended to produce that response. (3) U intended the fulfilment of the intention mentioned in (2) to be at least in part A's reason for fulfilling the intention mentioned in (1)." (p. 153)

unexpected use of indirect language, as seen in this study with the girls' apparent help-eliciting utterances.

What was observed among the girls in Study 1 appears then to be the production of a form of language (indirect social invitation) possibly in advance of their comprehension or conscious planning of such forms. This is a discrepancy which conventionally has been intuitively seems impossible, since we normally assume language comprehension to precede production, as witnessed in pre-verbal infants' understanding of various prohibitions (e.g. "Stop that!"). However, production does sometimes appear to be developing in advance of comprehension, as in the case of children's use of causal connectives in verbalising explanations (e.g. using "because," "since," "so") as described by Morag Donaldson (1986). She points out that appropriate use of these explanation terms can be observed among children as young as three, but generally eludes *testable* comprehension until around the age of seven. The possible reasons for the production/comprehension discrepancy for causal connectives which she reviews, can perhaps be generalised to other linguistic forms. In brief, these involve two main possibilities. One is that production and comprehension are in fact independent cognitive processes, which may draw upon linguistic knowledge in different ways (or even draw upon different stores of linguistic knowledge). The second explanation is that discrepancies in production and comprehension are possible artefacts of methodological approaches. She points out that studies on language production tend to be more observational and allow spontaneous communication from children (thus increasing the chances of hearing context-appropriate uses of language), whilst comprehension studies typically depend on greater experimental control, which is necessary in order to sufficiently isolate the stimulus material from outside "noise." If the girls' use of help-eliciting utterances in this study are indeed an example of indirect language that is social facilitating and precedes their conscious linguistic comprehension, these considerations described above will be of relevance.

The gender differences observed in this study, particular with regard to help-eliciting among the girls' fit into a stereotypical pattern pervasive among people's general beliefs about males and females in problem-solving situations. The argument presented here, suggesting that the girls between 3 - 5 years of age were using language in an indirect perhaps even non-literal way, may still seem to be too great a leap of ability to attribute to nursery-aged children. Indeed, this would appear to contravene commonly held beliefs about children's pragmatic ability and their understanding of implicature in language. However the linguistic feat of performing an act of meaning through implication or even irony, is only surprising or impressive if it does *not* take

the path of least resistance, linguistically. By this I am suggesting that perhaps the context of this study, a clearly task-oriented, "serious" one, in which task-talk was dominant, made it *easiest* for the children to make social in-roads through the "genre" of task-talk, especially that which forced some reciprocation on the part of the adult. This seems plausible in light of the literature stressing the role of context in children's understanding and use of language.

Bruner (1983), as mentioned in Section 2.11, discusses the form and function of children's problem-solving questions. He describes "*requests for supportive action*" and "*invitation requests*" as goal-directed and socially motivated respectively. He does not seem to go so far as to suggest that there is overlap in children as young as three, whereby "*requests for supportive action*" are linguistic devices which serve to engage an adult socially. However, the findings of Studies 1 and 2 suggest that preschool girls may in fact be using such utterances in this way, though possibly not consciously.

9.3.4 Interactional style: "speech genres," "voice" and "codes"

The differences observed in the children's use of language can be discussed from several important angles. Above we have discussed the findings in terms of what children are thought to be linguistically capable of and have made the suggestion that girls may be observed to use help-eliciting as a social device, in part because they are linguistically more advanced at this age as others have suggested (e.g. Tanz, 1987; Johnson and Meade, 1987). The argument for greater female social motivation as an underlying cause of more gregarious language use (help-eliciting or otherwise) is very attractive and has an enormous amount of research history supporting it. However, one must be careful not to automatically equate verbal fluency with greater social motivation, as pointed out early on by Maccoby and Jacklin (1974). They in fact report a very large proportion of studies as indicating no difference, at least on the measures of "sensitivity to social reinforcement." Thus, while it has been argued in this thesis that we must be careful not to equate social motivation with lesser achievement motivation among females; by the same token, it seems we must not automatically equate male "competitiveness" with lesser social sensitivity or motivation.

Aside from the philosophical issues surrounding the role of *intention* for labelling meaning within speech acts, the greater female inclination to engage the experimenter (male or female) through "help-eliciting" speech acts, witnessed in this study, has been argued to be one manifestation of differing interactional style. However this returns us to the dilemma of drawing a line between linguistic ability and social motivation.

Were the girls in this study using language in a socially engaging way because they were linguistically capable of doing so, leaving the boys willing but not able to interact in this way? The boys' predominantly "instrumental" and puzzle-oriented (as opposed to self-disclosing) language suggests this is not entirely the case. That is, their speech acts did not seem to reflect differences in quantity or surface complexity, but rather in communicative intentions. As put by Halliday in a discussion of language as meta-discourse (1992), ". . .the full creative power of an act of meaning arises from the fact that language BOTH construes AND enacts. It is not only a way of thinking about the world; it is also, at one and the same time, a way of acting on the world--which means, of course, acting on the other people in it." (p. 14) Thus it seems that the girls, when in this socially "dry" context, were more inclined *and* possibly capable of manipulating language to "act on the other people."

The differences observed in these boys and girls also fit within discussion from more sociological perspectives, relevant to the question of "where do these speech styles come from?" Halliday (1992) describes the work of Hasan (1990) who compared thousands of conversational messages of mothers and sons with those of mothers and daughters. Even among three-year-olds he observed fundamental "meta-discourse" differences. He writes that "They were different codes. . .consistent orientations to different ways of meaning, which construed boys and girls as different social beings. And the children's own part in the dialogues revealed very clearly--not by direct imitation of the mothers, which would make no sense, but by a deeper semiotic resonance in their grammar--that they were, at 3.5 years old, paid-up members of the social bond." (p. 13)

Similarly, Wertsch's (1991) discussion of speech genres included an explication of "voice" as a higher level (i.e. beyond semantics and syntax) set of communicative intentions, in much the same way as Gilligan's (1982, 1993) "different voice." Gilligan in particular refers to adolescent girls' greater desire behave (and presumably to achieve) collaboratively, as expressed in their more negotiative style of communication (see Section 2.6.2).

Without invoking a social learning model over an innate differences model or vice-versa, I am suggesting, as others have, that these communicative style differences may emerge at quite early ages. What may be especially surprising however, is the way in which these communicative differences seem to emerge covertly, even through a "mask" of purely task-oriented language.

9.4 Practical implications: effects of children's problem-solving communication on adult evaluations of task-ability

Study 3 addressed the most pressing practical question which was discussed as one of the background issues for this research and re-presented itself in the results of Studies 1 and 2. This question was whether adults naively observing children's problem-solving would attend mainly to their actual performance or be influenced by the level of "help-eliciting." To put this another way: If "help-eliciting" in its many forms can be described in some contexts as a "style" of interaction, is it one which creates a particular impression of task-ability?

The findings for Study 3 seemed to provide reason to believe that the answer to this question is "yes", although as with any experimentally derived effect, the results should be interpreted carefully. As discussed in Section 9.4.3, the tendency for ability to be masked by the constraints of the test setting, as is often the case for children's language comprehension studies, may also apply to the testing of interpretive ability among adults as well. Inexperienced teacher trainees and professionals alike appeared to be greatly influenced by the degree of "help-eliciting" in children who were in fact matched on task performance. However, as discussed in Chapter 8, they did not have the benefit of longer-term contact with each child, but were required to make a subjective evaluation of various aspects of task-ability, independence, confidence, etc. from a two-dimensional source of information, featuring children with whom they could not interact. The findings therefore have been interpreted as the degree of biasing that can possibly occur in the absence of sufficient or appropriate interaction. The no-difference findings for comparisons between the two groups of adults imply that the quality and duration of contact between a teacher or parent and an individual child may be of more importance than length of time working with children in general.

Nevertheless, it came as some surprise to find such consistent underrating of ability, confidence and independence of high "help-eliciting" children. This evidently occurred as an interpretation of the "meaning" of the children's utterances, rather than an adherence to old gender stereotypes, such as a generalised belief in greater male problem-solving ability. Across every measure, without exception, the subjects expressed the belief that the high "help-eliciting" boy *and* girl were less capable than the other two children. Although the potential for a gender bias was present, partly due to the spatial nature of the task, this was not what appeared to have occurred among the subjects in this study. Subjects were evidently affected by the style of the

interaction, which can amount to the same thing, if it is a style of interaction more often adopted by females. This was the conclusion drawn by Newcomb and Arnkoff (1979), Tannen (1993) and others as discussed in Section 2.15.1. Their assertion is that to say people hold gender biased beliefs about authority and power is an oversimplification. It is, rather, a complex interaction of how language styles are perceived. Deferential and polite linguistic forms whether spoken by a male or female are perceived as less powerful and authoritative. However, most research relates to speech styles of adults or adolescents, very little research is available with respect to how young children's styles of language use are perceived and interpreted by adults.

The under-estimation of ability relative to the two low-HEU children may have occurred because of a misunderstanding of a social message implicit in the children's utterances. Wells (1983) makes a similar point when he states that, "... when a task of any kind involves talk between teacher and child, the style of talk that occurs carries messages about the interpersonal relationships between them and about the teacher's orientation to the content of the task as well as messages about the task itself." (p. 142) The "message" about interpersonal relationships in this case may have been erroneously interpreted as being one of *dependence*, rather than of collaboration.

As with most research critically examining formal and informal assessments of children's ability, the recurring theme is the importance of the communicative context. This formed one central point in the critique of Piagetian-style cognitive testing. McGarrigle and Donaldson (1974), Hughes (1978) and many others since, have stressed the importance of assessing cognitive abilities without confounding children's contextual understanding with certain aspects of cognitive ability, as was the case in traditional conservation tests. An implication of much of this research has been that children's interpretations of adults' questions show surprising pragmatic and social awareness, which is often overlooked by adults in general. For example, Hughes and Grieve (1982) point out that children's early acquisition of a sense of "Gricean" conversational maxims are in part what makes them unable to correctly reject some questions as being nonsense. Their study of children's answers to bizarre questions suggests that children attempt to answer such questions "in good faith," i.e. they assume, through an awareness of normal social contexts, that a person posing such questions as "is yellow wider than red?" is attempting to adhere to conventional (Gricean) rules of communication. With respect to some of the looser social norms, such as ways of initiating and sustaining conversation, children also appear more advanced than conventionally believed, as suggested by children's early and frequent use of "test-questions" and requests for joint attention. Questions such as "where

does this go?" and "how do I do this one?" as observed in Studies 1 and 2, seem to readily fall into the category of "conversation questions" (e.g. James and Seebach, 1982).

The findings of Study 3 were that adults, irrespective of experience working with children, underestimated the task-ability of children who attempted to engage the experimenter through "help-eliciting." When placed within the framework of Study 1 results and the extensive research now available on children's pragmatic abilities, one might suggest that these adults underestimated the high-HEU children's problem-solving ability *through* an underestimation of what they were capable of, socially and linguistically. However, one must be careful in attempting to make attributions about the *process* of impression formation of others based upon narrowly defined evaluative responses.

As suggested above, the pervasive influence of communicative "style" was perhaps more a function of available interaction, rather than any intrinsic tendency to be biased. One pressing practical implication which emerges is not a new one, but certainly one subordinated in recent times for more expedient measures in education. This is the requirement for learning environments where adult-child contact is of high enough quality to allow individual differences in style of expression to be appreciated in light of actual ability and performance. High student-teacher ratios, at the very least, limit the amount of time and individual attention a teacher can give to any one child. Although this is a logical fact, it is difficult to assess or predict the long-term effects of more "production-line" educational atmospheres.

A brief look at available research examining class size as a factor in teaching effectiveness yields a high level of consensus among research in diverse educational contexts and age groups. It appears a great range of important educational quality factors suffer under conditions of high student-teacher ratios, including accuracy of teachers' assessments of cognitive ability (Wild and Rost, 1995), their stress levels (French, 1993) and the degree of "child-centred" teaching (i.e. that which is tailored to individual needs as opposed to reliance upon standardised commercial curriculum materials) (Ito, 1990).

Although there is also a considerable volume of work which has examined the effects of large class size on actual achievement and performance among children², there still

² Morrow and Smith (1990) examined children's story recall and comprehension and reported significant decreases among relatively large classes. McGivernin, Gilman and Tillitski (1989) conducted a meta-analysis of the links between class size and children's learning skills, and found significantly greater achievement among those in small-group

is very little research available which has been able to identify other *specific* individual factors which may affect the quality of the "intersubjectivity" needed for accurate interpretation of children's task-related communication. Research concerned with teacher experience, including the results of Study 3, suggests that experience may not provide an automatic improvement in teaching quality. Such things as personality and propensity for bias have also been examined (Babad, 1979; Babad, Inbar and Rosenthal, 1982). However, these do not lend themselves to discussion of progressive measures, since they may relate more to issues of upbringing and attitudes rather than educational policy.

9.5 Experimenter-gender effects

The issue of effects simply due to being a male experimenter in this type of experimental setting was raised very early on in the research. Several intuitive predictions (though conflicting) came to mind. Firstly, children these days are raised to be very careful of male strangers and as a result communication gender differences, especially asking for help, might not be accurately represented in this situation. In contrast, being a man in a nursery setting is very novel to children; and girls in particular may appear socially precocious. Alternatively, there may be a strong effect of same-sex affiliation and boys could be expected to behave more gregariously with a male experimenter. All of these possibilities, both experimentally and observationally have been supported elsewhere, depending on the context. A small sample of the available research reveals that there has never been a consensus with regard to experimenter-gender effects. Gold, Crombie, Brender and Mate (1984) for example, examined girls' and boys' dependency upon an adult model in a problem-solving task. They concluded that females followed an adult model more and were particularly affected by misleading information, but that the gender of the model did not have a significant bearing upon results. Imitative behaviour is quite closely linked; and Perry and Bussey (1979) in contrast, published findings which reinforced the imitative learning model for sex-typed behaviour. Their argument was that most *no-difference* findings in sex-of-adult-model research was an artefact of typical experimental conditions. Specifically, they assert that unfamiliar experimenters and novel task settings mask same-sex imitation effects which in reality occur as a function of the children's sensitivity to longer-term group norms. Their findings supported this model. In Studies 1 and 2 this possibility was largely avoided because of the extensive time taken to become thoroughly familiar to the children.

For this project a partial replication study was undertaken (with smaller sample size), using both a male and female experimenter in order to explore these possibilities. As described in Section 4.4, the intention was to have the two experimenters behave in a standardised way. The experimental procedure that was used primarily reflected our attempts to act "normally" whilst withholding help on an equal basis, both between the two experimenters and across all the children. As stated previously, we were not attempting to mimic each other nor engineer the female experimenter's behaviour to appear stereotypically masculine. In "being ourselves" we did find some subtle stylistic differences in our communication with the children. However, on the whole, when analysis of the children's behaviour had been completed (see section 6.7) very few differences in overall task-related language could be identified. The same patterns in help-eliciting, including the gender effects observed in the relationship between solving speed and HEU frequency persisted. More importantly, when both experimenters' behaviours had been analysed, it was found that there were no discernible patterns of either experimenter behaving differently with the boys versus the girls, especially in ways which may have reinforced the children for gender stereotypical behaviours or provided a stereotypical model of gender-typed behaviour. In this set of studies the behaviour of the two experimenters was standardised to a large degree, therefore *imitation* of the same-sex model was far less of an issue than it would be in studies where experimenter behaviours are uncontrolled. What had been a concern was *affiliative* behaviours which might be significantly influenced by the gender of experimenter. If help-eliciting communication can be shown to be a manifestation of affiliative behaviour, then the possibility of same-sex affiliation effects becomes important.

Although some adult and experimenter-gender effects are reported in the literature and were expected to some degree here, it seems likely that simply the amount of time spent becoming familiar with the children (several weeks in both studies) served to minimise any "novelty" or "strange-man" effects as well as the possible same-sex affiliation effects that are predicted by some researchers. This may be of importance within the issue of methodology in gender research with children.

9.6 Directions for further research

9.6.1 Children's problem-solving communication in other settings.

One important question which presents itself is whether early gender differences in problem-solving communication, particularly styles which may *appear* to reflect dependency or lack of confidence, recur in other problem-solving contexts. There are

many settings which historically have been perceived as sex-typed, in which such communication differences would *reinforce* inaccurate interpretations of ability, depending on the direction of sex-types. However, equally important are problem-solving contexts that are part of emerging technologies such as computing and the internet. Information technology is perhaps still "un-gendered," although according to Turkle (1988) and others it is rapidly becoming a male-appropriated realm. It is in these areas where differences in interactive styles, particularly in more salient "trouble-shooting" (debugging) contexts, may be important to understand. Further research could be conducted to explore communicative style differences in such educationally important contexts, where cooperative style could easily be misinterpreted as lack of confidence or ability.

9.6.2 Effects of adult gender on children's spontaneous communication

It was not within the scope of this research to study the possible effects of *stereotypically* masculine or feminine behaviour on children's interactive style, although Study 2 examined gender of experimenter as a possible variable. It would be of great interest to examine what spontaneous communicative differences and possible interactions occur within various gender pairings. As discussed earlier, this might be accomplished by designing an experimental setting whereby adults (male and female) are allowed to interact with children in a spontaneous and unself-conscious way. The results of this type of study might be important to understanding what role the predominance of women in primary education may have, if any. The only research available with regard to the effects of adult gender upon children's communication comes in the form of socialisation research--that which examines long term shaping of gender roles through modelling and imitation (Bem, 1981) and through "gender-appropriate" reinforcement (Mazur, 1987; Fagot et al. 1985). The issue of adult gender differences in interpreting and evaluating children's communication has been a fruitful area of research. As discussed in Section 2.15.1, females have been shown to be more sensitive decoders of verbal and non-verbal information (e.g. Bates, 1976; Zuckerman, Hall, DeFrank and Rosenthal, 1976). This would be of interest in a study of gender effects in the interpretation of children's help-eliciting communication, although it is difficult to predict whether this effect would result in greater accuracy in interpretation or greater bias.

9.6.3 The role of reduced interaction and feedback on adult interpretation of ability

In discussing the findings of Study 3, it was suggested that the adults were

dramatically influenced by the children's level of help-eliciting, partly as a function of minimal contact with the children, which raised the issue of class size and quality of student-teacher interaction. Research directly following on from this project could examine the degree of influence and biasing caused by styles of problem-solving communication. This would compare the types of interaction (real versus video; brief versus long, etc.) in terms of their effects on the sensitivity and accuracy of adult interpretations of task-ability. Results of such work might be of real importance for early childhood education funding policy.

9.7 Concluding remarks

The recent history of gender research was introduced at the beginning of this thesis in order to provide a socio-political context, but also to illustrate how polemics in any area of human behaviour and achievement research may lead to adherence to a model of development which is too rigid to accommodate ostensibly conflicting information. It can be argued that the women's movement made progress because of the prevalence of research which down-played differences, especially ones which were commonly thought to be innate (e.g. male aggression). The momentum needed to bring about early policy changes in education and employment opportunities and attitude changes among both men and women may have depended upon belief in strong and unwavering evidence that males and females, where it really matters, are not really different.

This seems to have created a climate of tension that one can detect even in the scientific literature. This emanated from a "mission" to create a level playing field for men and women on the one hand; yet occurring simultaneously was consciousness-raising research which was beginning to explore girls' and women's "different voices" (Gilligan 1982, 1992), different social motivations, (Tannen, 1990) and different modes of self-expression (Lakoff, 1975; Coates, 1993). The recurring theme, as discussed in Chapter 2, was that females interact, both with each other and with males, in a way which minimises conflict and overt competition, is deferential, cooperative and often self-deprecating. These attributes, as commonly interpreted, did not strengthen the image of women as perfectly fit to compete in all arenas of life on an equal basis with men--something which strict socialisation theorists were struggling to cultivate. Many of these "different-voice" theorists were criticised by their contemporaries on methodological grounds. Gilligan (1982) for example was faulted for making generalisations about female social development and expressive style that were based upon unstructured interviews of less than a dozen young women (Davis, 1992). Lakoff's (1973) thesis could be critiqued as being mainly

theoretical and rather speculative, as she herself writes, "The data on which I am basing my claims have been gathered mainly by introspection. . ." (p. 46) However the widespread grass-roots support of these theories among women (especially in the case of Gilligan) almost raises them to the level of self-evident truths.

In this thesis these issues have been addressed and in the light of the recent research (e.g. Tannen, 1993) and the findings of Studies 1 and 2, it was suggested that "affiliative motivation," as a constellation of pro-social communicative behaviours, does not necessarily reflect a *priority* (almost in a cognitive sense) which competes with and overrides mastery-motivation, task-related confidence, etc. An assumption which has also been challenged recently is the opposite belief about males--that they are fundamentally motivated by status, hierarchy and competition at the expense of sensitivity to social pressure.

It was pointed out, through review of recent research, that deferential and self-effacing language use in social settings is now considered a stylistic difference which distinguishes male and female speech. It has been used by many researchers to make attributions about deep seated social motivational differences. There has also been research which since Maccoby and Jacklin's (1974) review, has indicated that no reliable or substantive gender differences exist with regard to achievement motivation or more specifically, task-mastery. However, there has been far less research evidence to secure a conclusion that females have equal levels of confidence in problem-solving contexts. Girls and women are still reported to give lower self assessments, both in terms of achievement expectation as well as such intrinsic qualities as IQ (Beloff 1995). Affiliative language style is now widely recognised as a powerful social facilitator and is in no way "powerless." However, a point that is not often made is that deferential language style, in its many forms, is likely to be most salient as a confidence cue when heard in contexts where formal problem-solving, task-mastery or technical/mechanical achievement is the focus, even though efficient social interaction is still its root motivation. It seems likely we are just as concerned to interact smoothly and with minimal awkwardness in problem-solving dyads or groups, as we are in more overtly social situations.

The experimental setting that was used for this research explored this issue directly. It was clearly a task-oriented context, one which was mutually acknowledged (between experimenter and child) to have a specific and "serious" goal which was to solve the puzzle as efficiently as possible. A characterisation used previously was that it was a particularly "dry" social setting. As discussed, the girls in these studies used language which, if observed in a more playful or social setting, might be viewed

as having all the trappings of affiliative discourse: requests for joint attention, longer eye-contact, strategic use of terms of uncertainty, requests for assistance, greater use of collaborative expressions, etc. A suggested interpretation was that because the children were sensitive to the social constraints of the setting and because they felt (for the most part) the need to remain focused on the problem, they were able to appropriate task-oriented language to serve a social end. The ability to use language in indirect and non-literal ways is not surprising among accomplished speakers. The suggestion that girls (and some boys) as early as 3 or 4 deploy help-eliciting language as an indirect or even ironic means of engaging others would be very difficult to support were it not for the wealth of recent research which has continually uncovered evidence for surprisingly early pragmatic development. However because of the intrinsic difficulty in making attributions about very young children's internal subjective states, one must always hold the possibility of alternate processes (or indeed *combinations* of alternate processes) which may be responsible for these outward behaviour differences.

The issue of developmental linguistics remains important because one encounters the problem of drawing a line between the inclination to use language in this way and the ability to do so. The *intention* among preschoolers to use task-oriented help-eliciting utterances as linguistic devices for engaging others socially, implies they can reflect on language use itself and thus produce language that is context-embedded (about the problem-task), yet carries social meaning within it. If this interpretation is correct, then such language may reflect some aspects of metalinguistic knowledge. This is a claim that many developmental linguists would dispute, both in terms of production abilities and in terms of what constitutes metalinguistic ability. If true metalinguistic ability is only reflected with the understanding of disembedded language (as was argued by Donaldson (1978) *not* to be occurring in traditional Piagetian conservation tasks) then children prior to age 6 or 7 should not be *consciously* using language in the way proposed here. A looser definition of "metalinguistic knowledge" allows claims for earlier acquisition. It has been suggested (e.g. Mey, 1993; Jacobs and Jackson, 1983) that children produce non-literal or indirect utterances and come to understand their likely effects upon a listener (perhaps through imitation and modelling), prior to their linguistic understanding of them. This avoids the objections of many developmental linguists as well as language philosophers such as Grice who would argue that *intention* is a prerequisite for utterance *meaning*.

A possible interpretation has been offered here for the girls' use of task-related HEUs, which depends in part on several other aspects of verbal behaviour, as well as others' findings with regard to pragmatic ability. Such language (whether used by boys or

girls) may seem to reflect rather sophisticated use of language whose form may belie a fundamental, yet flexible motivation to achieve collaboratively. There is no indication, however, that this motivation in any way impaired their desire to master the task at hand. This interpretation benefits from the chance to analyse in a microanalytical way overall patterns in language use and the underlying relationship between the children's communicative behaviours and their actual performance. The children in this research who engaged the experimenter through relatively greater help-eliciting were later pervasively underestimated with regard to their confidence, independence and task-ability in spite of performance that was equal to other, low HEU children. These attributions, though appearing rather dramatically in an experimental setting, may, in more subtle forms, reflect a necessary evil in the day-to-day job of trying to make quick and efficient interpretations of how children are getting on in a busy classroom. Traditional and persistent gender stereotypes which link low levels of confidence and achievement expectation with deferential speech styles may compound the problem for girls. Unfortunately, exhaustive analysis of underlying contextual meaning is not something that a teacher in a busy and demanding classroom setting has the time to indulge in. What may be most important for education policy is to foster learning environments where teachers can afford to devote enough time to each child in order to become sensitive to individual styles of interaction and thereby fully appreciate each child's interests and capabilities.

APPENDICES

Letter to Lothian Regional Council Research Evaluation Committee

4 June 1993

Mr. A. K. Mackay
The Chairman
Research Evaluation Committee

Department of Education
Lothian Regional Council
40 Torphichen Street
Edinburgh EH 3 8JJ

Dear Mr. Mackay,

I am planning a study on communication as part of my Ph.D. research in psychology at the University of Edinburgh, where I am working under the guidance of my supervisors, Dr. Morag Donaldson and Dr. Hamish Macleod. I am writing to seek permission to conduct research in Lothian Region nursery schools or classes. Described below is the study, which will focus upon children's communication styles. I have included the aims of my research, past related work and my proposed method.

Overview of Research

My interest is focused upon the social aspects of problem solving as a dimension of gender role development. I am interested in studying children within the early years of development--ages 3 - 5. My central objective is to study possible gender differences in communicative style within the problem solving setting. Past research has identified various contexts in which children employ differing styles of communication, for example, gender differences in use of correct grammar, use of deferential language, and help-seeking communication. However, very few have looked at the problem solving context as a distinct setting for the study of communication.

In this study I will be examining possible ways in which girls' and boys' communicative behaviour may systematically differ. A second phase of this research will be to explore ways in which these possible differences may influence adults' expectations of children.

Work to date:

Preliminary research has included pilot studies conducted at nurseries at the University of St. Andrews and the University of Edinburgh. In these studies I examined the relationship between children's differing styles of communication and their problem solving skills. This was undertaken with a view to identifying differences in verbal and

non-verbal communication which may create misleading expectations among adult observers. The context used was a formal problem solving task: a picture puzzle requiring both pure spatial and thematic/pictorial manipulation. Verbal and non-verbal behaviour was assessed via videotaped sessions.

Research Plan

In the research that I hope conduct, I would like to be able to study communicative style further. This would include two phases of research. In the first phase I would be assessing the degree to which boys and girls differ in their style of communication across several different contexts. I am seeking permission to observe and videotape about 120 children divided fairly evenly between boys and girls. They should be preschool children, ranging in age from approximately 3 to 4.5 years. Each observation session would last about 15 minutes.

In the second phase I would be looking at how children's communication is received by adults. This would involve examining how adults interpret children's differing styles of communication, with respect to ability, confidence and performance. For this phase of the study I would like to ask parents and teachers from each school to participate, by viewing videotapes of children from other nurseries engaged in problem solving tasks, and then by completing a short questionnaire.

Study 1: Children's communicative style in the problem solving setting

- In this first study children would be individually given a problem to solve (e.g. jigsaw puzzle.) Whilst engaged in this problem solving task, their verbal and non-verbal communication would be observed. I would be recording the number of certain types of communication. These would include, for example, the number of visual contacts made by the child, and the number of number of times they ask for help. These observational sessions would be videotaped to allow for detailed analysis of the data.
- In addition to the spontaneous communication data that would be observed, I would be asking a few questions to each child following their completion of the puzzle. These would include for example, "*What did you think about that puzzle?*" "*Was that puzzle hard or easy for you?*"

Study 2: Adults' Interpretation of Children's Communicative Style

Because I am interested in the reciprocal nature of communication and learning I would also examine adult interpretation of children's communicative behaviour. This examination of adult interpretation would form the second part of my study and would involve the following:

- Adults would be shown videotaped sessions of children's problem solving activity, selected from the material acquired at other nurseries, during the child communication study. These would include children's video segments across several problem solving situations (e.g. formal puzzle problems, language based problem solving, and social problem solving.)

- After viewing the video segments, the adults would be asked to complete questionnaires which would include questions pertaining to each child's problem solving competence, confidence, and attitude toward the problem. Items on the questionnaire would include for example:

"Which child seemed the most confident?"

"Which child completed the problem faster?"

"Which child seemed to concentrate more?"

- These data would be analyzed in order to determine if a child's verbal or non-verbal communication, irrespective of actual competence, has a preemptive effect upon adults' interpretation. The experiment would attempt to determine in some key problem solving contexts, what expectations may emerge among adults, when faced with differences in spontaneous communicative behaviours.

Accomplishing this second phase of the study will require arranging times to meet with parents and teachers that are convenient for them. This will involve setting up individual times for them to view the video material and fill in the questionnaire.

Setting

Provided my research proposal meets with the Committee's approval, I hope to conduct the study among local Edinburgh schools that have nurseries, or among separate nursery schools.

For the first study, I would need a relatively quiet room, large enough to allow for videotaping equipment and for each child to participate without classroom distraction. For the second study the same room could be used.

Both these studies would, of course, be conducted so as to minimize any disruption to the classes. In addition, because the nature of the research is to focus upon overall trends, rather than individual performance, children's names would not be included in any report or publication, nor would participants in the second study be given any names of children. Parents and teachers would only view video segments of children from other nurseries. I have drafted a letter (enclosed) that I would send to parents to seek individual consent for their child to participate, providing my research is approved.

I am very enthusiastic about this research, and would welcome your advice as to which schools might be suitable for participating in this study. The results, I feel, will be of interest and value in terms of learning more about children's learning processes, and ultimately in maximizing children's potential. Thank you very much for your consideration of this request.

Sincerely yours,

Robert Bruce Thompson

Letter to parents of the Liberton Nursery School

30 November 1993

Dear Parent or Guardian,

I have recently received approval from Mrs. Sharp and Lothian Regional Council's Research Evaluation Committee to conduct a study on communication at the Liberton Nursery School. I am a Ph.D. student at the University of Edinburgh Department of Psychology. I am writing to ask for your permission to include your child in this study.

I am conducting the study at the Liberton Nursery School and in other local nursery schools as part of my study of children's communication styles. I would be spending about 15 minutes with each child, providing they want to participate, during normal school hours. The children would be solving various sorts of puzzles and problems. Following each problem solving task I would be asking them a few simple questions such as "*What did you think of that puzzle?*" and "*Was that puzzle hard or easy for you?*" I would be videotaping these sessions in order to be able to analyze them carefully later on.

The aim of this research is to study children's communication while solving problems. Because I am studying overall trends, rather than individual ability or performance, I will not mention any children by name in any report or publication.

In the second part of this study I will be looking at how adults interpret children's differing styles of communication. I will ask adults to view selected segments from the videos of children from various schools and fill in a questionnaire. I would be very pleased if you would permit me to use the videotape of your child for this part of the research (permission slip attached).

If you have any questions about this project, please feel free to contact me, or leave a telephone number on the attached slip, with an indication that you would like me to contact you. I look forward to conducting this research, and hope that your child might take part. Please complete the attached permission slip and return it to your child's teacher as soon as possible. Thank you very much.

Sincerely yours,

Robert Bruce Thompson

Permission form for children to participate in Study 1

University of Edinburgh Communication Study

Please answer "YES" or "NO" to each of the following questions:

- 1. Do you give permission for your child to participate in the communication research project and for the session to be videotaped? -----
- 2. Do you give permission for the videotape of your child to be used for the second part of the study (how adults interpret children's communication style) -----

Child's name:-----

Parent's/Guardian's name:-----

Parent's/Guardian's signature -----

Date: -----

PLEASE RETURN THIS SLIP TO YOUR CHILD'S TEACHER AS SOON AS POSSIBLE. THANK YOU.

Research proposal submitted to Moray House College

R. Bruce Thompson
Department of Psychology
University of Edinburgh
7 George Square
650-3424

Moray House Research Project Proposal
Autumn Term - 1994

I am conducting research on children's communicative styles, including gender differences, developmental changes etc. as part of my Ph.D. work in the Department of Psychology at the University of Edinburgh. An important part of my research is looking at how the communicative styles of children are interpreted by adults.

Because I am particularly interested in adult-child communication in the educational setting, I was hoping to recruit the help of student teachers at Moray House, to participate as subjects in my observer interpretation study. The intention of this study is to see how adults (particularly future teachers) evaluate the abilities of young children, based on their interpretations of verbal and non-verbal communication.

The running of this study can be done using group sessions during which I would show students four short video clips of children working individually on jigsaw puzzles. After viewing these video clips, each of which on average last about 4 minutes, I would give them a set of questionnaires asking them to express their beliefs about the children's behaviour. These questions would pertain to the children's overall task ability, style of puzzle solving, age appropriateness of puzzle, along with communicative style and ability. I would explain the nature of the study before they agreed to participate. In all, these sessions should last no longer than about one hour. I am hoping to have at least 50 students participate during the Autumn term. If possible, it would be ideal to be able to run sessions with about 10 students in each. I realise though, that this might not prove to be practical, so I could be quite flexible about the size and numbers of sessions. However, for the purposes of balancing the order of video clip presentation, at least two different groups would be needed. It would also be of interest to be able to compare groups representing different years of study. The study could be arranged as separate sessions with groups of students, or if possible, conducted during part of a class. I would be able to provide all the necessary materials and equipment, (VCR, questionnaire materials, etc.) although it would be very helpful if a viewing monitor was available. I would, of course, be very grateful for any logistical advice that you may have to offer.

If this research meets with the approval of staff at Moray House, I am certain any students or staff members would find participating in the study quite interesting, and the results, once they are analysed, informative. If there was an interest, I would be quite happy to do any form of follow-up discussion with staff and students once I had analysed the results. Thank you very much, I look forward to speaking with you about this project.

Letter to 1st year Moray House College students inviting participation in Study 3

20 October 1994

To 1st Year Moray House Students:

I am conducting research on children's problem solving in the Department of Psychology at the University of Edinburgh. An important part of my research is look at different contexts of problem solving among nursery children, and look for differences in strategy, general orientation toward problems, as well as developmental differences. Presently I am using the conventional jigsaw puzzle format, but in the future I hope to explore other settings in which problem-solving takes place, such as computer use. I am particularly interested in how adults in education view some aspects of the children's problem-solving. Therefore, I was hoping to recruit the help of students at Moray House, to participate in this study.

I will be showing four short video clips of children working individually on jigsaw puzzles. After viewing these video clips, I will be asking people to provide some of their impressions about the children's behaviour, including strategy, their orientation to the problem-solving task, etc. using brief questionnaires. The entire session only takes about 45 minutes. The video clips of these children are quite interesting to watch, and the discussion which follows should be very informative. I hope as many of you as possible will be able to participate.

There will be several opportunities to take part, and these sessions will be conducted during the free times available to students. The room number and times will be announced at least a week before they are run. I look forward to meeting with you all.

R. Bruce Thompson
Department of Psychology
University of Edinburgh

Individual child questionnaires (Study 3)

Jigsaw Puzzle Questionnaire

Child # _____

Name: _____

Date: _____

For each question, please circle the number opposite which you feel best answers the question. Feel free to change any answer later by carefully scoring out the first answer.

- 1 Did this puzzle seem appropriate for the child's level of ability?

1 2 3 4 5 6 7

too easy

too hard

- 2 What sort of strategy do you feel the child used: visualising the whole picture or by fitting pieces by their individual shape?

1 2 3 4 5 6 7

visualise pic.
both
ind. shapes

- 3 Did you feel this child has motor skills which are lower, higher, or about average for this level of development?

1 2 3 4 5 6 7

lower
average
higher

- 4 Do you feel the child could have done with some extra help?

1 2 3 4 5 6 7

none
some
a lot

- 5 How much confidence did the child seem to have in solving the puzzle?

1 2 3 4 5 6 7

very little
some
a lot

- 6 How many correctly placed pieces seemed to occur by luck?

1 2 3 4 5 6 7

very few
some
many

- 7 How independent did the child seem while working on the puzzle?

1 2 3 4 5 6 7

very dependent
very independent

Follow-up direct comparison questionnaires (Study 3)

Follow-Up Questionnaire

Name: _____

Date: _____

Below are boxes for each child. For each question, please indicate your answer by writing each child's number (corresponding to the order in which you saw them) in the boxes so that you have ranked them, from "least" to "most", for each question.

Example: Which child seemed to have the least/most developed motor skills?

Least				Most
	2	7	3	4

So, for this example above, the respondent indicated that they considered child #2 to have had the least motor development, child #4 the most, with child #1 and #3 taking the positions in-between.

	Least			Most
1 Which child seemed to need the least/most help from the experimenter?	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2 Which child seemed to have taken the least/most amount of time to solve the puzzle?	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3 Which child said the least/most things which implied they needed help?	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4 Which child seemed to have the least/most confidence in solving the puzzle?	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

For these children, what seemed to be the best indicator/s of ability?

REFERENCES

- Ackerman, B. (1978). Children's understanding of speech acts in unconventional directive frames, *Child Development*, **49**, 311-318.
- Ahlgren, A. (1983). Sex differences in the correlates of cooperative and competitive school attitudes, *Developmental Psychology*, **19**, 319 - 322.
- Archer J. and Lloyd, B. (1982). *Sex and Gender*, Harmondsworth: Penguin Books.
- Archer, J. (1992). Gender stereotypes of school subjects, *The Psychologist: Bulletin of the B.P.S.*, **5**, 66 - 69.
- Astington, J. (1990). Metapragmatics: Children's conception of promising, in *Children's Language Volume 7*, Conti-Ramsen, G. and Snow, C. (eds.), Hillsdale: Lawrence Erlbaum Associates.
- Atkinson, M. (1979). Prerequisites for reference, in *Developmental Pragmatics*, Ochs and Schieffelin (eds.), New York: Academic Press.
- Austin, A., Salehi, M. and Leffler, A. (1987). Gender and developmental differences in children's conversations, *Sex-Roles*, **16**, 97 - 510.
- Austin, J. (1962). *How to Do Things with Words*, Oxford University Press.
- Austin, J. (1971). Performative-constative, in *The Philosophy of Language*, Searle, J. (ed) Oxford University Press.
- Babad, E. (1979). Personality correlates of susceptibility to biasing information, *Journal of Personality and Social Psychology*, **37**, 195 - 202.
- Babad, E. and Inbar, J. (1982). Pygmalion, galatea and the golem: Investigations of biased and unbiased teachers, *Journal of Educational Psychology*, **74**, 459 - 474.
- Babad, E., Bernieri, F. and Rosenthal, R. (1989). Non-verbal communication and leakage in the behaviour of biased and unbiased teachers, *Journal of Personality and Social Psychology*, **56**, 89 - 94.

- Babad, E., Inbar, J. and Rosenthal, R. (1982). Teachers' judgments of students' potential as a function of teachers' susceptibility to biasing information, *Journal of Personality and Social Psychology*, **42**, 541 - 547.
- Bakeman, R. and Gottman, J. (1986). *Observing Interaction: An Introduction to Sequential Analysis*, Cambridge University Press.
- Bakhtin, M. M. (1986). *Speech Genres and Other Late Essays*, Emerson, C. (ed.), University of Texas Press.
- Bandura, M. and Dweck, C. S. (1985). Self-conceptions and motivation: The relationship of conceptions of intelligence and achievement goals to patterns of cognition, affect and behaviour, Unpublished manuscript, Harvard University, *cited in text by Cain and Dweck (1995)*.
- Bardwick, J. (1971). *Psychology of Women: A Study of Bio-Cultural Conflicts*, New York: Harper and Row Publishers.
- Barkley, R., Ullman, D., Otto, L. and Brecht, J. (1977). The effects of sex typing and sex appropriateness of modeled behaviour on children's imitation, *Child Development*, **48**, 721 - 725.
- Barnett, M., Sinisi, C., Jaet, B., Bealer, R., Rodell, P. and Saunders, L. (1989). Perceived gender differences in children's help-seeking, *Journal of Genetic Psychology*, **15**, 451-460.
- Bates, E. (1976). Requests and responses in children's speech, *Journal of Child Language*, **2**, 41-63.
- Bates, E., Camaioni, L. and Volterra, V. (1979). The acquisition of performatives prior to speech, in *Developmental Pragmatics*, Ochs and Schieffelin (eds.), New York: Academic Press.
- Bates, J. E. (1976). Effects of children's nonverbal behaviour upon adults, *Child Development*, **47**, 1079 - 1088.
- Becker, J. (1988). I can't talk, I'm dead: Preschoolers' spontaneous metapragmatic comments, *Discourse Processes*, **11**, 457 - 467.

- Becker, J. (1990). Processes in the acquisition of pragmatic competence, in *Children's Language Volume 2*, Conti-Ramsden, G. and Snow, C. (eds.), Hillsdale: Larence Erlbaum Associates.
- Belmont, J. (1989). Cognitive strategies and strategic learning, *American Psychologist*, **44**, 142 - 148.
- Beloff, H. (1992). Mother, father and me: Our I.Q., *The Psychologist*, July 1992, 309 - 312.
- Bem, S. (1974). Measurement of psychological androgyny, *Journal of Consulting and Clinical Psychology*, **42**, 155 - 162.
- Bem, S. (1981). Gender Schema Theory: A cognitive account of sex typing, *Psychological Review*, **88**, 354 - 364.
- Benbow, C. (1988). Sex differences in mathematical reasoning ability in intellectually talented preadolescents: Their nature, effects and possible causes, *Behavioural and Brain Sciences*, **11**, 169 - 232.
- Benbow, C. and Stanley, J. (1980). Sex differences in mathematical ability: Fact or artifact?, *Science*, **210**, 1262 - 1264.
- Benbow, C. and Stanley, J. (1983). Sex differences in mathematical reasoning ability: More facts, *Science*, **222**, 1029 - 1031.
- Berko-Gleason, J. (1973). Code switching in children's language, in *Cognitive Development and the Acquisition of Language*, New York: Academic Press.
- Berko-Gleason, J. (1978). The child's learning of English morphology, in *Readings in Language Development*, Bloom, L. (ed.) Wiley and Sons Publishers, 1978.
- Berko-Gleason, J. (1987). Sex differences in parent-child interactions, in *Language, Gender and Sex in Comparative Perspective*, Philips, S. Steele, S. and Tanz, C. (eds.), Cambridge University Press.

- Bethencourt, J. and Torres, E. (1987). Sex difference and the solution of mathematical problems: A cross-gender study, *Infancia-y-Aprendizaje* (English Abstracts), **38**, 9 - 20.
- Bianci, B. and Bakeman, R. (1978). Sex-typed affiliation preferences observed in preschoolers: Traditional and open school differences, *Child Development*, **49**, 10 - 912.
- Block, J. (1982). Assimilation, accomodation and the dynamic of personality, *Child Development*, **53**, 281 - 295.
- Block, J. (1983). Differential premises arising from differential socialization of the sexes: Some conjectures, *Child Development*, **54**, 1335 - 1354.
- Bloom, L. (1978). Developmental change in the use of single-word utterances, in *Readings in Language Development*, Bloom, L. (ed) New York: John Wiley and sons Ltd., 1978.
- Brem, C. and Johnson, M. (1989). Problem-solving appraisal and coping styles: the influence of sex role orientation and gender, *Journal of Psychology*, **123**, 187 - 194.
- Brissett, M. and Nowicki, S. (1973). Internal versus external control of reinforcement and reaction to frustration, *Journal of Personality and Social Psychology*, **25**, 35 - 44.
- Brown, P. and Levinson, S. (1978). Universals in language usage: Politeness phenomena, in *Questions and Politeness*, Goody, E. (ed.), Cambridge University Press, 1978.
- Brown, R. (1978). The development of Wh questions in children's speech, in *Readings in Language Development*, Bloom, L. (ed.) Wiley and Sons Publishers.
- Bruner, J. (1983). *Child's Talk: Learning to Use Language*, Oxford University Press.
- Buck, R. (1975). Nonverbal communication of affect in children *Journal of Personality and Social Psychology*, **31**, 644 - 653.

- Burnett, S. (1986). On sex differences in spatial abilities, *American Psychologist*, September 1986, 1012 - 1014.
- Burroughs, E. (1990). Discourse and sex as correlates of adults' judgment of children, *Perception and Motor Skills*, **71**, 807 - 816.
- Cain, K. and Dweck, C. (1995). The relation between motivational patterns and achievement cognitions through the elementary school years, *Merrill Palmer Quarterly*, **41**, 25 - 54.
- Cameron, D. (1989) Introductory chapter, *Women in Their Speech Communities* Coates, J. and Cameron, D. (eds.), New York: Longman, Inc.
- Campbell, S. and Douglas, V. (1972). Cognitive styles and responses to the threat of frustration, *Canadian Journal of Behavioural Science*, **4**, 30 - 42.
- Caplan, P., MacPherson, G. and Tobin, P. (1985). Do sex related differences in spatial abilities exist?, *American Psychologist*, September, 786 - 799.
- Cazden, C. (1977). General issues: The question of intent in *Interaction, Conversation and the Development of Language*, Lewis, M. and Rosenblum, L. (eds.), New York: John Wiley and sons, 1977.
- Chipman, S., Marshall, S. and Scott, P. (1991). Content effects on word problem performance: A possible source of test bias?, *American Educational Research Journal*, **28**, 897 - 915.
- Coates, J. (1987, 1993 2nd ed). *Men Women and Language* New York: Longman, Inc.
- Coates, J. and Cameron, D. (eds) (1989) *Women in Their Speech Communities* Coates, J. and Cameron, D. (eds.), New York: Longman, Inc.
- Condry, J. and Condry, S. (1976). Sex differences: A study of the eye of the beholder, *Child Development*, **47**, 812 - 819.
- Costanzo, P. and Siegal, A. (1993). Social context, social behaviour, and socialisation: investigating the child's developing organisation of the behavioural field, *Journal of Experimental Child Psychology*, **55**, 127-130.

- Coulter, J. (1994). Is contextualising necessarily interpretive, *Journal of Pragmatics*, **21**, 689-698.
- Craig, H. and Evans, J. (1991). Turn exchange behaviours of children with normally developing language: The influence of gender, *Journal of Speech and Hearing Research*, **34**, 866 - 878.
- Crandall, V. (1969). Sex differences in expectancy of intellectual and academic reinforcement, *Achievement Related Motives in Children*, Smith, C. (ed.), Russell Sage Foundation.
- Crombie, G. (1984). Compliance in young girls and boys in relation to problem-solving skills and parent socialisation, Doctoral dissertation, *Dissertation Abstracts International*, **45**, 381b.
- Culler, J. (1982). *On Deconstruction: Theory and Criticism After Structuralism*, Cornell University Press.
- Davis, K. (1992). Toward a feminist rhetoric: The Gilligan debate revisited, *Women's Studies International Forum*, **15**, 219 - 231.
- De Cooke P. and Brownell, C. (1995). Young children's help-seeking in mastery-oriented contexts, *Merrill-Palmer Quarterly*, **41**, 229 - 246.
- Deaux, K and Emswiller, T. (1974). Explanations of successful performance on sex linked tasks: What is skill for male is luck for the female, *Journal of Personality and Social Psychology*, **29**, 80 - 85.
- Deaux, K. and Major, B. (1987). Putting gender into context: An interactive model of gender related behaviour, *Psychological Review*, **94**, 369 - 387. 1987.
- Deiner, C. I. and Dweck, C. S. (1980). An analysis of learned helplessness: The processing of success, *Journal of Personality and Social Psychology*, **39**, 940 - 952.
- Denmark, R. (1995). Can I play? An anthropological entry into the play and social relationships of nine-year-old girls, Paper presented to the Conference on Children and Social Competence, University of Surrey, July, 1995.

- Denno, D. (1982). Sex differences in cognition: A review and critique of the longitudinal evidence, *Adolescence*, **17**, no. 68.
- Derrida, J. (1977). Signature, event, context, *Glyph I*: 172 - 197, cited in text by Coulter, 1994.
- Diamond, M. C. (1988). *Enriching heredity: The Impact of the Environment on the Anatomy of the Brain*, Free Press.
- Donaldson, M. (1978). *Children's Minds*, Cambridge University Press.
- Donaldson, M. L. (1986). *Children's Explanations, A Psycholinguistic Study*, Cambridge University Press.
- Dore, J. (1977). 'Oh them sheriff': A pragmatics analysis of children's reponses to questions, in *Language Thought and Culture: Advances in the Study of Cognition*, Ervin-Tripp, S. and Mitchell-Kernan, C. (eds.), New York: Academic Press.
- Dore, J. and McDermott, R.P. (1982). Linguistic indeterminacy and social context in utterance interpretation, *Language*, **58**, 374-394. 1982.
- Dunn, J. (1988). *The Beginnings of Social Understanding*, Oxford: Basil Blackwell.
- Dweck, C. (1976). Children's interpretation of evaluative feedback: the effect of social cues on learned helplessness, *Merrill Palmer Quarterly*, **22**, 105 - 109.
- Eccles, J., Kaczala, C. and Meece, J. (1982). Socialization of achievement attitudes and beliefs: Classroom influences, *Child Development*, **53**, 322 - 339, 1982
- Eccles, J., Kaczala, C. and Meece, J. (1984). Sex differences in achievement: A test of alternate theories, *Journal of Personality and Social Psychology*, **46**, 26 - 43.
- Eliot, J. (1986). Comments on Caplan, MacPherson and Tobin *American Psychologist*, September 1986, 1011.

- Entwisle, D. and Baker, D. (1983). Gender and young children's expectations for performance in arithmetic, *Developmental Psychology*, **19**, 200 - 209.
- Ervin-Tripp, S. (1970). Discourse agreement: How children answer questions, in *Cognition and the Development of Language*, Hayes, J. (ed.) New York: John Wiley and sons .
- Ervin-Tripp, S. (1979). Children's verbal turn-taking, in *Developmental Pragmatics*, Och., E. and Schieffelin, B. (eds.), New York: Academic Press.
- Ervin-Tripp, S. and Miller, W. (1977). Early discourse: Some questions about questions, in *Interaction, Conversation and the Development of Language*, Lewis, M. and Rosenblum (eds.), New York: John Wiley and sons.
- Esposito, A. (1979). Sex differences in children's conversations, *Language and Speech*, **22**, 213-220.
- Fagot, B. (1977). Consequences of moderate cross-gender behaviour in preschool children, *Child Development*, **48**, 902 - 907.
- Fagot, B., Hagen, R., Leinbach, M. and Kronsberg, S. (1985). Differential reactions to assertive and communicative acts of toddler boys and girls, *Child Development*, **56**, 1499 - 1505.
- Feather, N. (1975). Positive and negative reactions to male and female success and failure in relation to the perceived status and sex-typed appropriateness of occupations, *Journal of Personality and Social Psychology*, **31**, 536 - 548.
- Feather, N. and Simon, T. (1977). Attribution of responsibility and valence of outcome in relation to initial confidence and success and failure of self and other, *Journal of Personality and Social Psychology*, **18**, 173 - 188.
- Fernyhough, C. and Russell, J. (1995). Distinguishing one's own voice from others': A function for private speech?, paper presented to the BPS Annual Developmental Psychology Conference, University of Strathclyde, Glasgow.

- Ferrier, L. (1978). Some observations of error in context. *The Development of Communication*, Waterson, N. and Snow, C. (eds.), New York: John Wiley and sons .
- Fitzpatrick H. and Hardman, M. (1994). Gender and the classroom computer: do girls lose out? in *Group and Interactive Learning*, Foot, H., Howe, C., Anderson, A., Tolmie, A., and Warden, D. (eds.), Computational Mechanics Publications.
- French, N. (1993). Elementary teacher stress and class size, *Journal of Research and Development in Education*, 26, 66 - 73.
- Freund, L. (1990). Maternal regulation of children's problem-solving behaviour and its impact on children's performance, *Child Development*, 61, 113 - 126.
- Frey, K. and Ruble, D. (1987). What children say about classroom performance: Sex and grade differences in perceived competences, *Child Development*, 58, 1066 - 1078.
- Garai, J. and Scheinfeld, A. (1968). Sex differences in mental and behavioural traits, *Genetic Psychology Monographs*, 77, (2).
- Garvey, C. (1977). The contingent query: A dependent act in conversation in *Interaction, Conversation and the Development of Language*, Lewis, M. and Rosenblum, L. (eds.), New York: John Wiley and sons .
- Gelb, S. (1989). Language and the problem of male salience in early childhood classroom environments, *Early Childhood Research Quarterly*, 4, 205 - 215.
- Gilligan, C. (1982, 1993). *In a Different Voice*, Cambridge: Harvard University Press.
- Gleason, J. and Weintraub, S. (1978). Input language and the acquisition of communicative competence, in *Childrens Language, Volume 1*, Nelson, K. E. (ed.), Gardner Press.
- Goffman, E. (1959). *The Presentation of Self in Everyday Life*, New York: Doubleday.

- Gold, D., Crombie, G. and Noble, S. (1987). Relations between teachers' judgments of girls' and boys' compliance and intellectual competence, *Sex Roles*, **16**, 351 - 358.
- Gold, D., Crombie, G., Brender, W. and Mate, P. (1984). Sex differences in children's performance in problem-solving situations involving an adult model, *Child Development*, **55**, 543 - 549.
- Goodwin, M. H. (1993). Tactical use of stories: Participation frameworks within girls' and boys' disputes, in *Gender and Conversational Interaction*, Tannen, D. (ed.), Oxford University Press.
- Gordon D. and Nowicki, S. (1981). Observed maternal and child behaviours in a dependency producing task as a function of children's locus of control orientation, *Merrill Palmer Quarterly*, **27**, 43 - 51.
- Grice, H. P. (1969). Utterers' meaning and intentions, *The Philosophical Review*, **78**, 144 - 177.
- Grice, H. P. Meaning, (1957). *The Philosophical Review*, **66**, 377 - 388.
- Grieve, R. (1990). Children's awareness in *Children's Understanding*, Grieve, R. and Hughes, M. (eds.), Oxford: Basil Blackwell.
- Griffiths, D. and Saraga, E. (1979). Sex differences in cognitive abilities, a sterile field of inquiry? in *Women: Sex Role Stereotypes*, Hartnett, O., Boden, G. and Fuller, M. (eds.), London: Tavistock Publications.
- Gunnar, H. and Donahue, M. (1985). Sex differences in social responsiveness between six months and twelve months, *Child Development*, **56**, 1499-1505.
- Haas, A. (1984). Male and female spoken language differences: Stereotypes and evidence, *Psychological Bulletin*, **20**, 83 - 88.
- Habermas, J. (1989). *The Theory of Communicative Action*, translated by Thomas McCarthy, Lifeworld and system (2): A critique of functionalist reason Cambridge, Polity Press.

- Halberstadt, A. and Hall, J. (1980). Who's getting the message? Children's nonverbal skill and their evaluation by teachers, *Developmental Psychology*, **16**, 564 - 573.
- Hall, J. (1978). Gender effects in decoding nonverbal cues, *Psychological Bulletin*, **85**, 845 - 857.
- Halliday, M. A. C. (1975). *Learning How to Mean: Explorations in the Development of Language*, Edward Arnold Publishers.
- Halliday, M. A. C. (1992). The act of meaning, paper presented to the Georgetown University Round Table on Languages and Linguistics, in *Language, Communication and Social Meaning*, Alatis, J. (ed.), Georgetown University Press.
- Halliday, M. A. C. (1993). Towards a language-based theory of learning, *Linguistics and Education*, **5**, 93 - 116.
- Halpern, D. (1986). On sex differences in spatial abilities, *American Psychologist*, September, 1014 - 1016.
- Halpern, D. (1992). *Sex Differences in Cognitive Abilities*, (2nd ed.) Hillsdale: Larence Erlbaum Associates, Publishers.
- Harris, L. J. (1978). Sex differences in spatial ability: Possible environmental, genetic, and neurolgical factors, *Asymmetrical Function of the Brain* Kinsbourne (Ed), 405 - 522, *cited in text by Halpern, (1992)*.
- Harris, M. and Coltheart, M. (1986). *Language Processing in Children and Adults: An Introduction*, London: Routledge & Kegan Paul.
- Harris, M. and Rosenthal, R. (1985). Mediation of interpersonal expectancy effects: 31 meta-analyses, *Psychological Bulletin*, **97**, 363 - 386.
- Harter, S. (1975). Developmental differences in the manifestation of mastery motivation on problem solving tasks, *Child Development*, **46**, 370 - 378.
- Harter, S. (1978). Effectance motivation reconsidered: Toward a developmentalal model, *Human Development*, **21**, 34 - 64.

- Hasan, R. (1990). Semantic variation and sociolinguistics, *Australian Journal of Linguistics*, 9, 2.
- Hay, D. and Lockwood, R. (1989). Girls' and boys' success and strategies on a computer generated hunting task, *British Journal of Developmental Psychology*, 7, 17 - 27.
- Heathers, G. (1955). Emotional dependence and independence in nursery school play, *Journal of Genetic Psychology*, 87, 37 - 57.
- Henderson, V. L. and Dweck, C. S. (1990). Motivation and achievement, in *At the Threshold: The Developing adolescent*, Jeldman, S. S. and Elliott, G. R. (eds.), Harvard University Press.
- Hill, K. and Dusek, J. (1969). Children's achievement expectation as a function of social reinforcement, sex of subject, and test anxiety, *Child Development*, 40, 547 - 557.
- Hiscock, M. (1986). On sex differences in spatial abilities *American Psychologist*, September, 1011 - 1012.
- Hoffman, L.W. (1972). Early childhood experience and women's achievement motive, *Journal of Social Issues*, 28, no. 2, 129 - 155.
- Holzman, M. (1977). The use of interrogative forms in the verbal interaction of three mothers and their children in *Interaction, Conversation, and the Development of Language*, Lewis, M and Rosenblum, L. (eds.), New York: John Wiley and sons Publications.
- Horner, M. S. (1972). Toward an understanding of achievement related conflicts in women, *Journal of Social Issues*, 28, 157 - 175.
- Houtz, J. C. and Jambor, S. (1989). Locus of control, task directions and type of problems: effects in creativity, *Creativity Research Journal*, 2, 118 - 125.
- Hughes, M. (1978). Selecting pictures of another person's point of view, *British Journal of Educational Psychology*, 48, 210 - 219.

- Hughes, M. and Grieve, R. (1982). On asking children bizarre questions in *Early Childhood Development and Education: Readings in Psychology*, Donaldson, M. Grieve, R. and Pratt, C. (eds.), Oxford: Basil Blackwell.
- Hutt, C. (1972). *Males and Females*, Harmondsworth: Penguin Books.
- Huttonlocher, J., Haight, W., Bryk, A. and Seltzer, M. (1991). Early vocabulary growth: Relation to language input and gender, *Developmental Psychology*, **27**, 36 - 248.
- Hyde, J. S. (1984). Children's understanding of sexist language, *Developmental Psychology*, **20**, 79 - 83.
- Ito, A. (1990). Teaching styles and class size in Japanese and Korean primary schools, *Psychological Reports*, **66**, 1103 - 1106.
- Jacklin, C. N. (1989). Female and male: issues of gender, *American Psychologist*, **44**, 127 - 133.
- Jacobs, S. and Jackson, S. (1983). Speech act structure in conversation: Rational aspects of pragmatic coherence, in *Conversational Coherence*, Craig, R. and Tracy, K. (eds.), Sage Publications.
- James, S. and Seebach, M. (1982). The pragmatic function of children's questions, *Journal of Speech and Hearing Research*, **25**, 2 - 11.
- Johnson, E. and Meade, A. (1987). Developmental patterns of spatial ability: early sex differences, *Child Development*, **58**, 725 - 740.
- Julian, Regula and Hollander, E. (1968). Effects of prior agreement by others on task confidence and conformity, *Journal of Personality and Social Psychology*, **15**, 171-178.
- Jussim, L. (1986). Self-fulfilling prophecies: A Theoretical and Integrative Review, *Psychological Review*, **93**, 429 - 445.
- Jussim, L. (1989). Teacher expectations: Self-fulfilling prophecies, perceptual biases, and accuracy, *Journal of Personality and Social Psychology*, **57**, 469 - 480.

- Karmiloff-Smith, A. (1979). *A Functional Approach to Child Language*, Cambridge University Press.
- Kee, D., Gottfried, A., Bathhurst, K. and Brown, K. (1987). Left-hemisphere language specialisation: Consistency in hand preference and sex differences, *Child Development*, **58**, 718 - 724.
- Killen, M. (1995). Preschool children pay attention to their addressee, *Discourse Processes*, **19**, 329.
- Kimura, D. (1969). Spatial localization in the left and right visual fields, *Canadian Journal of Psychology*, **23**, 445 - 458.
- Kimura, D. (1992). Sex differences in the brain, *Scientific American*, **267**, 118 - 125.
- Klecan-Aker, J. (1986). A comparison of language functions used by normal male and female preschool children in a structured setting, *Language and Speech*, **29**, 221 - 229.
- Kohlberg, L. (1966). A cognitive developmental analysis of children's sex-role concepts and attitudes, in *The Development of Sex Differences*, Maccoby, E. E. (ed.), Stanford University Press.
- Kohlberg, L., Yaeger, J. and Hjertholm, E. (1968). Private speech: four studies and a review of theories, *Child Development*, **39**, 691 - 736.
- Kugiumutzakis, J. (1985). The origins, development, and function of early infant imitation, Uppsala University Ph.D. dissertation, *cited in text by Trevarthen*, 1994.
- Kuhn, Nash and Brucken (1978). Sex role concepts of two and three year olds, *Developmental Psychology*, **49**, 445 - 452.
- Labov, W. (1972). *Language in the Inner City*, Oxford: Basil Blackwell, 1972.
- Lakoff, R. (1973). Language and women's place, *Language in Society*, **2**, 45 - 80.

- Lakoff, R. (1975). *Language and Women's Place*, London: Harper and Row Publishers.
- Lakoff, R. (1977). Language and sexual identity, *Semiotica*, **19**, 119 - 130, cited in text by Newcombe and Arnkoff, 1979.
- Leaper, C. (1991). Influence and involvement in children's discourse: Age, gender, and partner effects, *Child Development*, **52**, 797 - 811.
- Lenney, E. (1977). Women's confidence in achievement settings, *Psychological Bulletin*, **84**, 1 - 13.
- Leventhal, G. and Herbert, H. (1990). Effect of subjects' sex and sex role attitudes on real and perceived performance using gender-related stimuli with traditional and non-traditional female experimenter, *Psychological Reports*, **66**, 259 - 266.
- Lloyd, P. and Beveridge, M. (1981). *Information and Meaning in Child Communication*. New York: Academic Press.
- Lyons, J. and Serbin, L. (1986). Observer bias in scoring boys' and girls' aggression, *Sex Roles*, **14**, 301 - 313.
- Macauley, R. (1977). The myth of female superiority in language *Journal of Child Language*, **5**, 353-363.
- Maccoby, E. (1990). Gender and relationships: a developmental account, *American Psychologist*, **45**, 513 - 520.
- Maccoby, E. and Jacklin C. (1974). *The Psychology of Sex Differences*, Stanford University Press.
- Maccoby, E. and Masters, J. (1970). Attachment and dependency, in *Carmichael's Manual of Child Psychology*, Mussen, P. H. (ed), New York: John Wiley and sons .
- Maccoby, E., Snow, M. and Jacklin, C.N. (1984). Children's disposition and mother interaction of 12 months and 18 months: A short-term longitudinal study, *Developmental Psychology*, **20**, 459 - 464.

- Mann, B. and Hoffman, S. (1985). The potential for teachers' gender bias in their responses to childrens' oral language functions, *Education*, **106**, 265 - 217.
- Manning, B. (1994). Young children's private speech as a precursor to metacognitive strategy use during task engagement, *Discouse Processes*, **17**, 191.
- Marcus, D. and Overton, W. (1978) The development of cognitive gender constancy and sex role development, *Child Development*, **49**, 434 - 444.
- Martinez, M. A. (1987). Dialogues among children and between children and their mothers *Child Development*, **58**, 1035-1043.
- Mazur, E. (1987). Imitative interchanges in a social context: Mother - infant matching behaviour at the beginning of the second year, *Merrill-Palmer Quarterly*, **33**, 453 - 472.
- McGarrigle, J. and Donaldson, M. (1974). Conservation accidents, *Cognition*, **3**, 341 - 350.
- McGuinness, D. and Pribram, R. (1980). Strategies, demands, and lateralized sex differences, *Behavioural and Brain Sciences*, **3**, 244, cited in text by Caplan, MacPherson and Tobin, 1985
- Mead, M. (1935). *Sex and Temperament in Three Primitive Societies*, London: Routledge and Kegan Paul.
- Mead, M. (1942). *The American Character*, Hamondsworth: Penguin Books.
- Meimann, M. and Schaller, J. (1985). Imitative reactions among 14 - 21 day old infants *Infant Mental Health Journal*, **6**, 31-39, 1985.
- Mey, J. (1993, 1994). *Pragmatics: An introduction*. Blackwell.
- Miller, C. and Crouch, J. (1991). Gender differences in problem solving: expectancy and problem context, *Journal of Psychology*, **125**, 327 - 336.

- Mills, S. (1995). *Feminist Stylistics*, London: Routledge.
- Mitchell, C. (1987). Relationship of femininity, masculinity and gender to attribution or reesponsibility, *Sex-Roles*, **16**, 151 - 163.
- Morrow, L. and Smith, J. (1990). The effect of group size on interactive storybook reading, *Reading Research Quarterly*, **25**, 213 - 231.
- Nelson, K. (1973). Structure and strategy in learning to talk, *Monographs of the Society for Research in Child Development*, **38**, 149.
- Nelson-Le Gall, S. (1981). Help-seeking: An understudied problem-solving skill in children, *Developmental Review*, **1**, 224 - 246.
- Nelson-Le Gall, S. and Glor-Scheib, S. (1985). Help-seeking in elementary school classrooms: An observational study, *Contemporary Educational Psychology*, **10**, 58 - 71.
- Nelson-Le Gall, S. De Cooke, P. A. and Jones, E. (1989). Children's perceptions of competence and helpseeking, *Journal of Genetic Psychology*, **150**, 457 - 459.
- Newcombe, N. and Arnkoff, D. (1979). Effects of speech style and sex of speaker on person perception, *Journal of Personality and Social Psychology*, **37**, 1293 - 1303.
- Nicholson, J. (1984). *Men and Women: How Different Are They?*, Fontana Paperbacks.
- Northman, J. (1978). Developmental changes in preferences for help, *Journal of Clinical Child Psychology*, **7**, 129 - 132.
- Ochs, E. (1979). Transcription as theory, in *Developmental Pragmatics*, Och, E. and Schieffelin, B. (eds.), New York: Academic Press.
- Ochs, E. Schieffelin, B. and Platt, M. (1979). Propositions across utterances and speakers, in *Developmental Pragmatics*, Och, E. and Schieffelin, B. (eds.), New York: Academic Press.

- Ochs-Keenan, E. (1983). conversational competence in children, in *Acquiring Conversational Competence*, Ochs-Keenan, E. and Schieffelin, B. (eds.), London: Routledge and Kegan Paul.
- Paley, V. G. (1987). *Girls and Boys: Superheroes in the Doll-Corner*, University of Chicago Press.
- Pellegini, A. (1984). A speech analysis of preschoolers' dyadic interaction, *Communication and Cognition*, **17**, 425 - 436.
- Perry, D. and Bussey, K. (1979). The social learning theory of sex differences: imitation is alive and well, *Journal of Personality and Social Psychology*, **37**, 1699 - 1712.
- Petersen, A. C. and Hood, K. D. (1988). The role of experience in cognitive performance and brain development, in *Genes and Gender Women at Work: Socialization Toward Inequity*, The Gordian Press.
- Petzel, T. Johnson, J. and Bresolin, L. (1989). Peer nominations for leadership and likeability in problem solving groups as a function of gender and task, *Journal of Social Psychology*, **130**, 641 - 648.
- Piaget, J. (1926, 1955). *The language and thought of the child*, London: Routledge and Kegan Paul.
- Piel, J. (1990). Unmasking sex and social class differences in childhood aggression: The case for language maturity, *Journal of Educational Research*, **84**, 100 - 106.
- Poulin-Dubois, D and McGilly, C. (1989). Psychology of computer use: effect of learning logo on children's problem solving skills, *Psychological Reports*, **64**, 1327 - 1337.
- Przetacznik-Gierrowska, M. and Ligeza, M. (1990). Cognitive and interpersonal functions of children questions in *Children's Language, Volume 2*, Conti-Ramsden, G. and Snow, C. (eds.), Hillsdale: Larence Erlbaum Associates.

- Ramer, A. (1976). The development of syntactic complexity, *Journal of Child Language*, **3**, 49 - 62.
- Recanati, F. (1986). On defining communicative intentions, *Mind and Language*, **1**, no 3, 213 - 227.
- Richmond, V. and Gorham, J. (1988). Language patterns and gender role orientation among students in grades 3 - 12, *Communication Education Abstracts*, **37**, 142 - 144.
- Robert, T. and Nolen-Hoeksema, S. (1989). Sex differences in reactions to evaluative feedback, *Sex Roles*, **21**, 725-748.
- Romar, N. (1975). The Motivation to avoid success and its effects on performance in school aged males and females *Developmental Psychology*, **11**, 635 - 639.
- Rosenthal, R. and Rosnow, L. R. (1991). *Essentials of Behavioural Research Methods and Data Analysis*, McGraw-Hill International.
- Rotter, J. B. (1975). Some problems and misconceptions related to the construct of internal versus external locus of control of reinforcement, *Journal of Consulting and Clinical Psychology*, **43**, 56 - 67.
- Rotter, J.B. (1966). Generalized expectancies for internal versus external control of reinforcement, *Psychological Monographs*, **80**, no. 609, cited in text by Brissett, M. and Nowicki, S. (1973).
- Ruebush, B.K. and Waite, R. (1961). Oral dependency in anxious and defensive children, *Merrill Palmer Quarterly*, **7**, 181 - 190.
- Sach, J. (1987). Preschool boys' and girls' language use in pretend play in *Language, Gender and Sex in Comparative Perspective*, Philips, S. Steele, S. and Tanz, C. (eds.), Cambridge University Press, 1987.
- Sanders, R. and Freeman, K. (1995). Children's neo-rhetorical participation in peer interactions, paper presented to the Conference on Children and Social Competence, University of Surrey, UK, July.

- Sappington, J., Larsen, C., Martin, J. and Murphy, K. (1991). Sex differences in math problem solving as a function of gender specific item content, *Education and Psychological Measurement*, **51** 1041 - 1048.
- Schachter, F. Shore, R. Hodapp, S. Chalfin, S and Bundy, C. (1978). Do girls talk earlier?: Mean length of utterance in toddlers, *Developmental Psychology*, **14**, 388 - 392.
- Schaefer, L and Springle, J. (1988). Gender differences in the use of logo programming language, *Journal of Education Computing Research* , **4**, 49 - 53.
- Schiffrin, D. (1990). *Approaches to Discourse*, Oxford: Blackwell.
- Schwartz, S. and Clausen, G. (1970). Responsibility, norms, and helping in an emergency, *Journal of Personality and Social Psychology*, **16**, 299 - 310.
- Scrimgeour, R. (1993). Gender bias in the classroom?, *SCRE Newsletter*, Research in Education, Spring 1993, 11 - 12.
- Searle, J. (1969). *Speech Acts: An essay in the philosophy of language*, Cambridge University Press.
- Searle, J. (1971). *The Philosophy of Language*, Oxford University Press.
- Sheldon, A. (1990). Pickle Fights: Gendered talk in preschool children, *Discourse Processes*, **13**, 5 - 32.
- Sinclair, A. and Van Gessel, R. (1990). The form and function of questions in children's conversations, *Journal of Pragmatics*, **14**, 923-944.
- Singleton, C. H. (1986). Biological explanations of sex-role stereotyping, in *The Psychology of Sex Roles*, Hargreaves, D. and Colley, A. (eds.), London: Harper and Row Publishers.
- Skaalvik, E. (1990). Gender differences in general academic self-esteem and in success expectations on defined academic problems, *Journal of Educational Psychology*, **82**, 593 - 598.

- Small, M. (1995). Rethinking human nature (again), *Natural History*, September, 8.
- Snow, C. (1981). The uses of imitation, *Journal of Child Language*, 8, 205 - 212.
- Snow, C., Perlmann, R., Berko-Gleason, J. and Hooshyar, N. (1990). Developmental perspectives on politeness, *Journal of Pragmatics*, 14, 289-305.
- Spence, J., Helmreich, R. and Stapp, J. (1975). Ratings of self and peers on sex-role attributes and their relation to self esteem and concepts of masculinity and femininity, *Journal of Personality and Social Psychology*, 32, 29 - 39.
- Spender, D. (1995a). Nattering on the net: Girls on the internet Inaugural Paper presented for the Word-Power Conference Edinburgh, October 1995.
- Spender, D. (1995b). *Nattering on the Net: Women, Power and Cyberspace*, Australia: Spinifex Press.
- Stein, A. H. and Bailey, M. The socialization of achievement orientation in females, *Psychological Bulletin*, 80, 345 - 365 1972
- Stipek, D. J. and MacIver, D. (1989). Developmental change in children's assessment of intellectual competence, *Child Development*, 60, 521 - 538.
- Stipek, D., Recchia, S. and McClintic, S. (1992). Self-evaluation in young children, *Monographs of the Society for Research in Child Development*, 57, no. 226.
- Sutton-Smith B. and Rosenberg, B. (1960). Manifest anxiety and game preferences *Child Development*, 31, 307 - 311.
- Tannen, D. (1990). *You Just Don't Understand Me: Men and Women in Conversation*, Virago Press.
- Tannen, D. (1993). *Gender and Conversational Interaction*, Oxford University Press.
- Tanz, C. (1987). Introductory chapter in *Language, Gender and Sex in Comparative Perspective*, Philips, S. Steele, S. and Tanz, C. (eds.), Cambridge University Press.

- Taylor, M. (1979). Race, sex and the expression of the self-fulfilling prophesy in a laboratory teaching situation, *Journal of Personality and Social Psychology*, 37, 897 - 912.
- Thompson, R. B. (1989). Sex role development in preschool children: The role of modelling and cognition *Unpublished MA dissertation*, University of St. Andrews.
- Trevarthen, C. (1992). An infants' motives for speaking and thinking in the culture, in *The Dialogical Alternative*, Wold, A.H. (ed.), Scandanavian University Press.
- Trevarthen, C. (1994). Infant semiosis in *Origins of Semiosis: Sign Evolution in Nature and Culture*, Noth, W. (ed.) Mouton de Gruyter.
- Trevarthen, C. and Marwick, H. (1982). *Co-operative Understanding in Infants*, Project Report to the Spencer Foundation, University of Edinburgh, Department of Psychology.
- Trudgill, P. (1972). Sex, covert prestige and linguistic change in the urban British English of Norwich, *Language in Society*, 1, 179-195.
- Trudgill, P. (1983). *Sociolinguistics: An Introduction to Language and Society*, Cambridge University Press.
- Turkle, S. (1988). Computational reticence: Why women fear the ultimate machine, in *Technology and Women's Voice: Keeping in Touch*, Kramarae, C. (ed.), London: Routledge and Kegan Paul.
- Tyack, D. and Ingram, D. (1976). Children's production and comprehension of questions, *Journal of Children's Language*, 4, 211-224.
- Vaidyanathan, R. (1988). Development of forms and functions of interrogatives in children: A longitudinal study in Tamil, *Child Development*, 15, 533 - 549.
- Van Hecke, M. and Tracy, R. (1983) Sex differences in children's responses to achievement and approval, *Sex Roles*, 13, 165 - 173.

- Van Hecke, M., Tracy, R., Cotler, S. and Ribort, S. (1984). Approval vs. Achievement motives in 7th grade girls, *Sex Roles*, **11**, 33 - 37.
- Viaene, N. (1979). Sex differences in the explanation of success and failure, in *Women: Sex Role Stereotypes*, Harnett, O., Boden, G. and Fuller, M. (eds.), London: Tavistock Publications.
- Vygotsky, L. S. (1972). *Rzvitie Vysshikh Psikhicheskikh Funktsii* [The development of higher mental function], Moscow: Izdatel'stvo Akademii Pedagogicheskikh Nauk, cited in text by Wertsch, 1991.
- Vygotsky, L. S. (1978). *Mind in Society: The Development of higher Psychological Processes*, Cole, M. John-Steiner, V. Scribner, S. and Souberman, E. (eds.), Cambridge: Harvard University Press.
- Vygotsky, L. S. (1986). *Thought and Language*, translated by Alex Kozulin, Cambridge: The M.I.T. Press.
- Wapner and Connor (1986). Role of defensiveness in cognition and impulsivity, *Child Development*, **57**, 1370 - 1374.
- Wells, G. (1983). Talking with children: The complementary roles of parents and teachers in *Early Childhood Development and Education: Readings in Psychology*, Donaldson, M. Grieve, R. and Pratt, C. (eds.), Oxford: Basil Blackwell.
- Wertsch, J. (1991). *Voices of the Mind*, Harvester-Wheatsheaf.
- Wertsch, J., McNamee G., McLane, J. and Budwig, N. (1980). The adult-child dyad as a problem-solving system, *Child Development*. **51**, 1215 - 1221.
- White, J. (1986). The writing on the wall: Beginning or end of a girl's career?, *Women's Studies International Forum*, **9**, 561 - 574.
- Wild, K. and Rost, D. (1995). Class size and the accuracy of teachers' assessments *Zeitschrift fur Entwicklungspsychologie und Padagogische Psychologie* (English abstracts), **27**, 78-90.

- Wildstein and Thompson (1989). Locus of control, expectation and problem solving, *Perception and Motor Skills*, **68**, 383 - 391.
- Wilson, K. and Shantz, N. (1978). Perceptual role taking ability and dependency behaviour in preschool children, *Merrill Palmer Quarterly*, **23**, 207 - 211.
- Wood, D. and Middleton, D. (1975). A study of assisted problem-solving, *British Journal of Psychology*, **66**, 181 - 191.
- Woods, N. (1989). Talking shop: Sex and status as determinants of floor apportionment in a work setting, in *Women in their speech communities*, Coates, J. and Cameron, C. (eds.), New York: Longman Inc.
- Young, G. and Wilson, J. (1994). Comparing matching ability, spatial memory, and ideational fluency in boys and girls, *Perceptual and Motor Skills*, **79**, 1019 - 1024.
- Zimmerman, D and West, C. (1975). Sex roles, interruptions and silences in conversation in *Language and Sex: Difference and Dominance*, Thorne, B. and Henley, N. (eds.), Rowley: Newbury House Publishers.
- Zucherman, D. (1985). Confidence and aspirations: Self esteem and self concepts as predictors of students' life goals, *Journal of Personality*, **53**, 543 - 560.
- Zuckerman, M. and Wheeler, L. (1975). To dispel fantasies about the fantasy-based measure of fear of success, *Psychological Bulletin*, **82**, 932 - 946.
- Zuckerman, M., DeFrank, R., Hall, J. and Rosenthal, R. (1976). Encoding and decoding of spontaneous and posed facial expressions, *Journal of Personality and Social Psychology*, **34**, 966 - 977.